UNITED STATES DEPARTMENT OF THE INTERIOR GEOLOGICAL SURVEY

EXPLORATORY DRILLING IN THE COALMONT COAL FIELD, JACKSON COUNTY, COLORADO, JUNE-NOVEMBER 1977

Ву

Dawn Hill Madden

Open-File Report 77-887

1977

This report has not been edited for conformity with Geological Survey editorial standards or stratigraphic nomenclature.

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EXPLORATORY DRILLING IN THE COALMONT COAL FIELD, JACKSON COUNTY,

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By Dawn Hill Madden

INTRODUCTION

The Himes Drilling Company, Inc., Grand Junction, Colorado, and Jim Feighny and Son, Loveland, Colorado, rotary drilled 52 holes and cored the coal in 3 holes in the Coalmont coal field, Jackson County, north-central Colorado (figs. 1-10, table 1). The drilling was done under Contract Nos. 14-08-0001-15769 and 14-08-0001-15798 awarded by the U.S. Geological Survey. Geophysical logging of the holes was done by Minerals Service Company, Grand Junction, Colorado. The purpose of the drilling was to obtain information about the depth, thickness, extent, and quality of coal in the Coalmont Formation, as part of the Survey's program to evaluate and classify federally owned coal resources. Most of the holes are located within areas nominated for coal leasing by industry.

U.S. Geological Survey personnel provided general supervision of the drilling, which included selecting the drill sites, determining depths to be drilled, and obtaining permission for access from the County and from private surface owners. Survey personnel also described the rocks in the cuttings at each site and compiled and analyzed the drill-hole data. Some of the holes (M-5, M-6, C-7, C-8, C-17, C-19, C-30, C-32, M-35, C-41, C-47, M-62, S-72, S-73, B-74, M-101, M-102, M-109, and M-110) were completed as observation wells. These wells will be used to monitor water level and quality over a period of at least 3 years. Water level will be measured quarterly with a steel tape, and samples will be pumped yearly to be tested for major cations

and anions and selected trace metals. Data obtained will be used to define the ground-water system and to aid in studies of the hydrologic impact of coal development. These data will be made available upon request from the U.S. Geological Survey, Water Resources Division, Colorado District Office, Lakewood, Colorado.

GEOPHYSICAL LOGS

Geophysical logs for each hole consist of natural gamma (G), spontaneous potential (SP), and resistivity (RES), which were measured with one probe, and density (DEN), which was measured with a separate probe. Where fluid level within the drill hole changed during logging, two fluid levels were recorded on the log. Only one fluid level, that measured by the natural-gamma spontaneous-potential resistivity probe, is listed in the log headings in this report. Geophysical logs were reduced to 20 percent of the original size for this report, and the logging scales listed in the log headings were changed accordingly. The geophysical logs are oriented so that higher gamma and resistivity and lower rock density readings are recorded to the right. The aquifer depth intervals and the quantity of waterflow (gal/min (GPM)) from drillers' logs are shown on the log headings.

LITHOLOGIC LOGS

Lithologic logs were made by adjusting descriptions of 5-foot cuttings intervals to correspond with the geophysical logs.

DRILL-HOLE DEPTHS, DIAMETERS, AND LOCATIONS

Depths of the drill holes range from 98 feet to 860 feet and the diameter of each hole is 4-3/4 inches. Locations and elevations are approximate.

CORE HOLES

Three of the drill holes (M-5, C-7, and C-9) were later twin drilled for the purpose of coring the Riach coal bed. Core samples have been submitted

to the U.S. Bureau of Mines for proximate and ultimate analyses, Btu/lb heating values, forms of sulfur present, and percent ash. The U.S. Geological Survey Analytical Laboratories in Denver will do the analyses for major, minor, and trace elements. Results of the analyses will be included in a future report.

COAL GEOLOGY

The major coal-bearing deposits are in the Coalmont Formation of Paleocene and Eocene age, which includes the Riach coal bed and several thinner coal beds in the Coalmont area. The coal occurs in the lower part of Hail's upper member of the Coalmont Formation, at least 2,400 feet above the base of the formation (Hail, W. J., Jr., 1968, Geology of southwestern North Park and vicinity, Colorado, U.S. Geol. Survey Bull. 1257, 110 p.).

The coal-bearing strata dip eastward to northward at angles generally less than 20° . Normal faults, trending north-northwestward, break the strata into numerous fault blocks, some less than 1/4-mile wide.

COAL CORRELATIONS AND COAL BED THICKNESS

At least 10 drill holes (M-5, C-7, C-9, M-11, M-12, M-41, C-96, C-98, M-100, and M-104) intersected what is tentatively correlated as the Riach coal bed in T. 7 N., R. 80 W. The coal is thickest (over 20 feet) in sec. 18, and it thins to the south and east. The coal bed is more than 15 feet thick in secs. 18, 22, and 28, and is at least 10 feet thick in secs. 15, 18, 19, 21, 22, 27, and 28.

The other coal beds in the area are thinner and are probably of much less economic value than the Riach coal bed. These have not yet been correlated between drill holes.

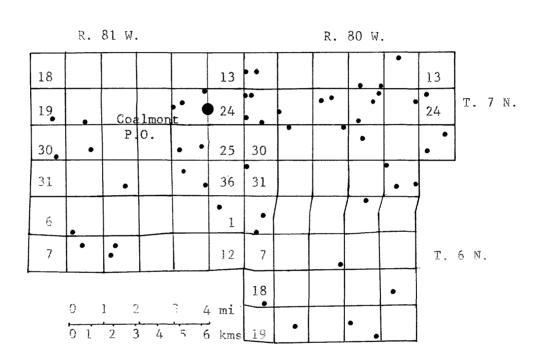


Figure 1.--Map showing drill-hole locations in the Coalmont coal field, Jackson County, Colorado.

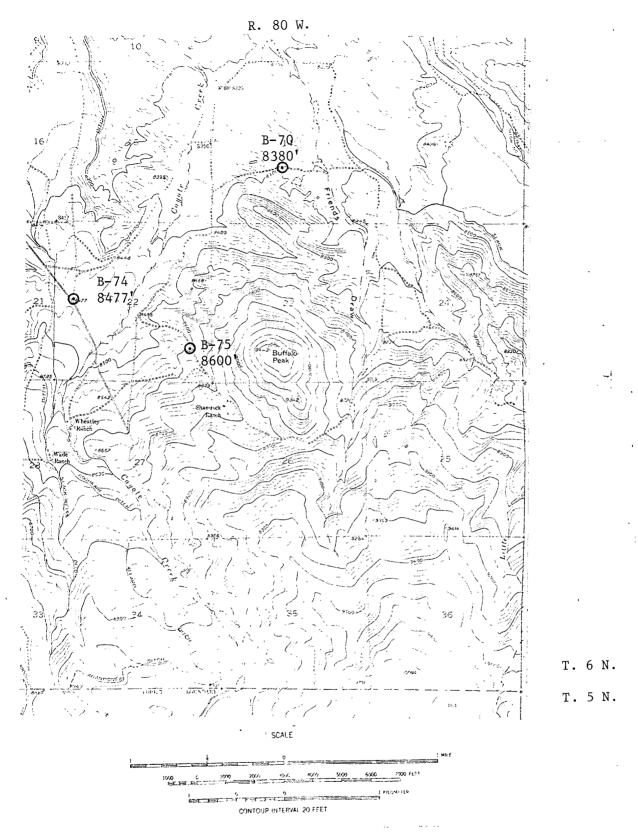


Figure 2. Locations of drill holes, NW¹/₄ of the Buffalo Peak quadrangle, Jackson County, Colorado.

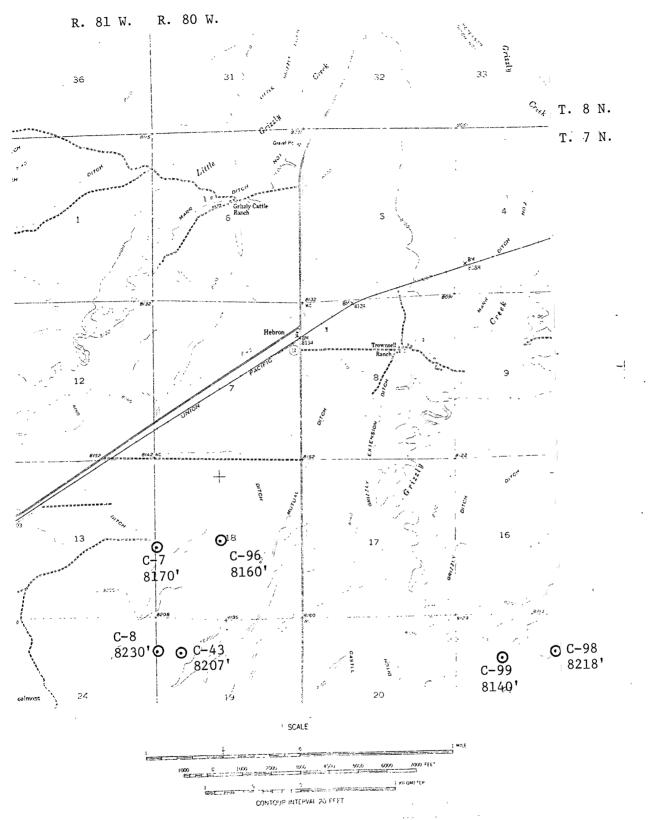


Figure 3. Locations of drill holes, $NE^{\frac{1}{2}}$ of the Coalmont quadrangle, Jackson County, Colorado.

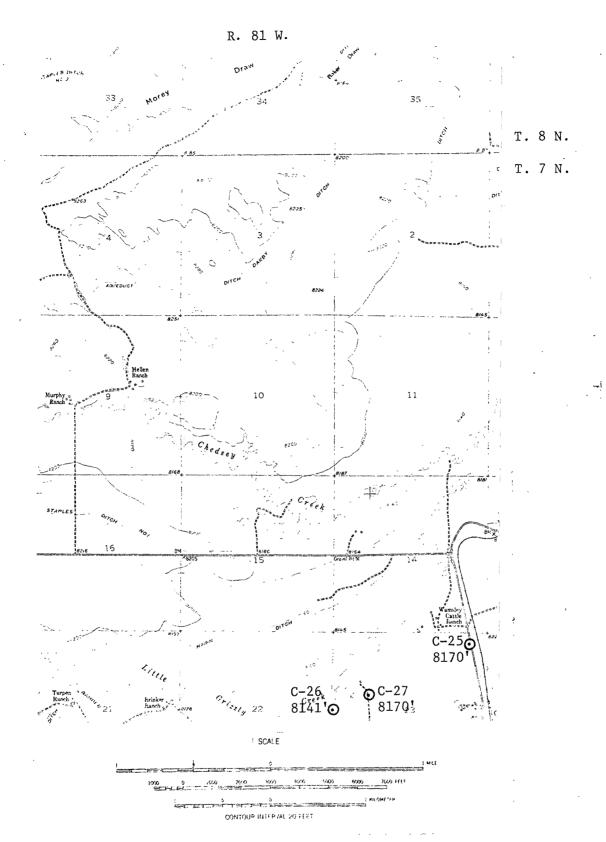


Figure 4. Locations of drill holes, NW4 of the Coalmont quadrangle, Jackson County, Colorado.

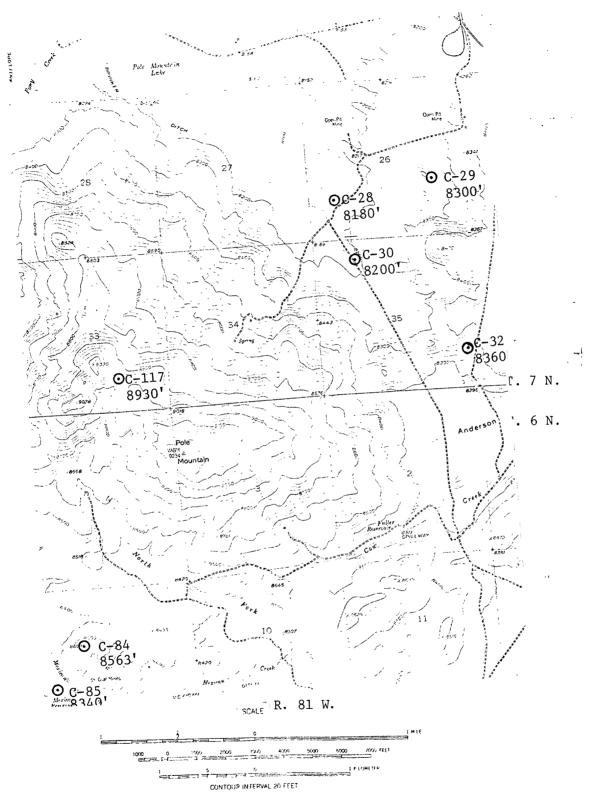


Figure 5. Locations of drill holes, SW_4 of the Coalmont quadrangle, Jackson County, Colorado.

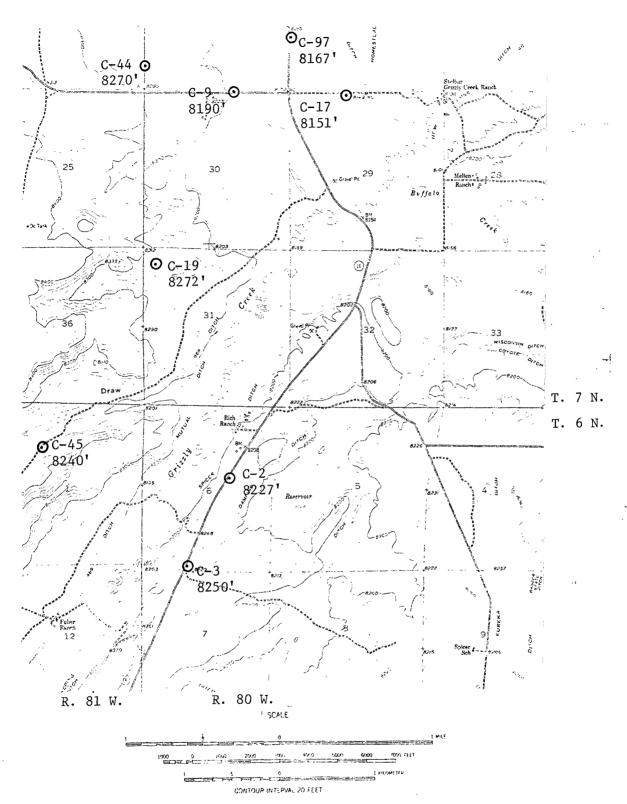


Figure 6. Locations of drill holes, SE4 of the Coalmont quadrangle, Jackson County, Colorado.

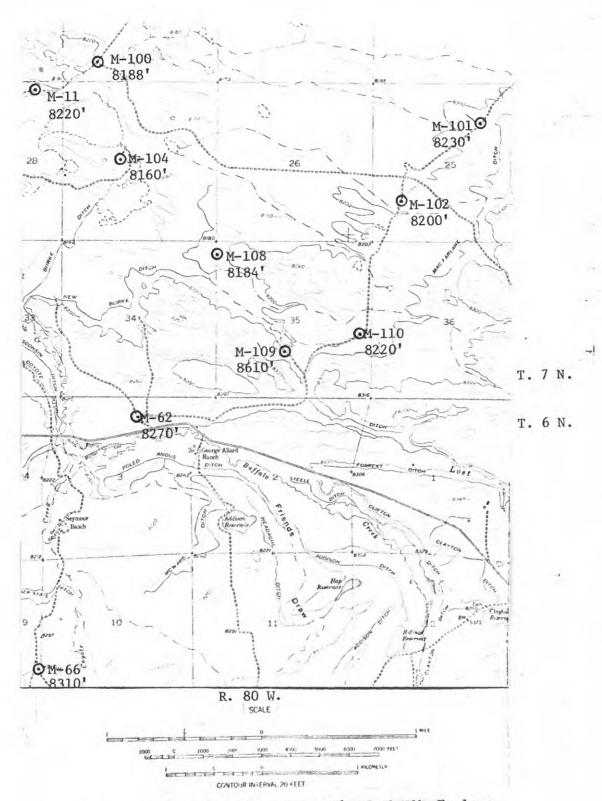
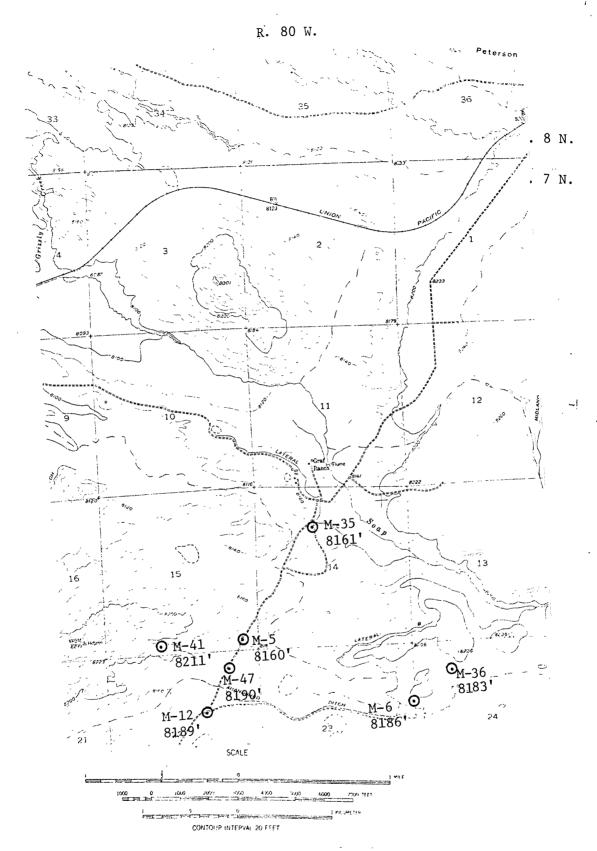


Figure 8. Locations of drill holes, SW4 of the MacFarlane Reservoir quadrangle, Jackson County, Colorado.



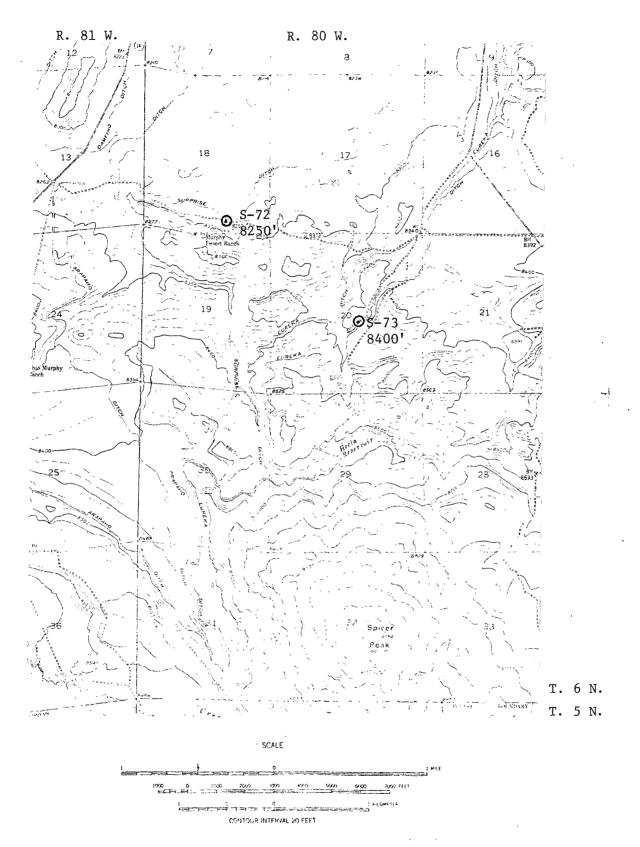


Figure 9. Locations of drill holes, NE $\frac{1}{4}$ of the Spicer Peak quadrangle, Jackson County, Colorado.

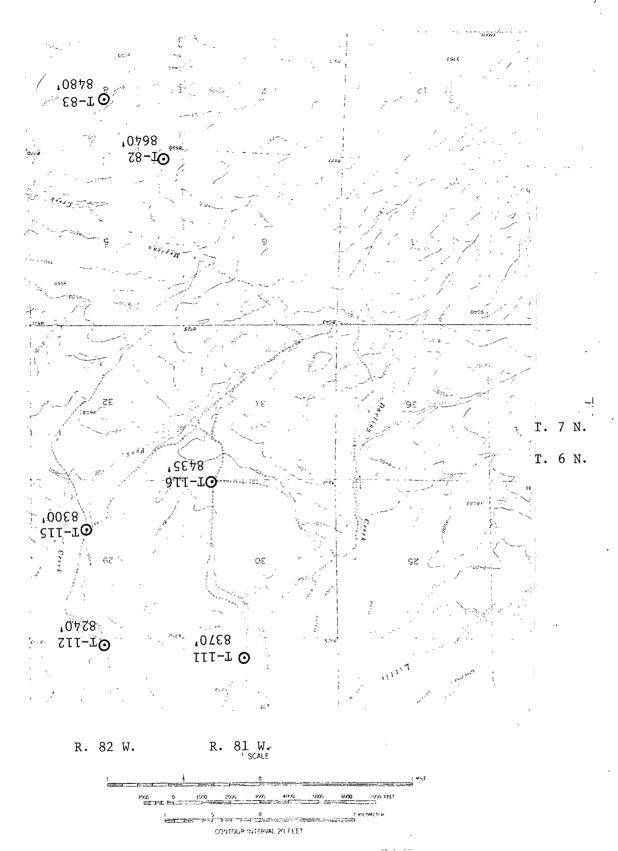


Figure 10. Locations of drill holes, SE^{1}_{4} of the Teal Lake quadrangle, Jackson County, Colorado.

Table 1.--Locations of drill holes in the Coalmont coal field, Jackson County, Colorado (listed by township and range)

[Measurements are in feet; to convert to meters, multiply by 0.3048]

T. 6 N., R. 80 W., M62 sec. 3, NW4NE4, 8,270 64	.0 640
M62 coc 3 NUENEE 8 270 6/	.0 640
1102 Sec. 5, 110411114 0,270 0-	
C2 sec. 6, SW4NE4 8,227 80	00
C3 sec. 6, SE ¹ 4SW ¹ 4 8,250 80	00 800
M66 sec. 9, NE ¹ 4SE ¹ 4 8,310 80	00 800
B70 sec. 14, NE4SW4 8,380 59	591
S72 sec. 18, SW4SE4 8,250 86	00 800
S73 sec. 20, NW ¹ 4SE ¹ 4 8,400 80	00 800
B74 sec. 22, SW4NW4 8,477 80	00 800
B75 sec. 22, SE4SE4 8,600 78	782
T. 6 N., R. 81 W.,	
C45 sec. 1, $SE^{1}4NW^{1}4$ 8,240 30	00 298
T82 sec. 5, $SW_{4}SW_{4}$ 8,640 23	203
T83 sec. 8, SW4NE4 8,480 40	00 400
C84 sec. 9, SE ¹ 4NW ¹ 4 8,563 40	00 400
C85 sec. 9, NW4SW4 8,340 50	00 500
T. 7 N., R. 80 W.,	
M35 sec. 14, CE ¹ 2NW ¹ 4 8,161 60	00 600
M41 sec. 15, SE¼SW¼ 8,211 84	0 840
M5 sec. 15, SE½SE½ 8,160 86	860
C7 sec. 18, NW4SW4 8,170 60	00 600
C96 sec. 18, NE4SW4 8,160 38	380
C8 sec. 19, NW4NW4 8,230 50	00 498
C43 sec. 19, NW4NW4 8,207 30	300
C44 sec. 19, SW4SW4 8,270 30	300
C9 sec. 19, SW4SE4 8,190 48	480
C97 sec. 20, $Nw_4^2Sw_4^2$ 8,167 56	560

Table 1.--Locations of drill holes in the Coalmont coal field, Jackson County, Colorado (listed by township and range) - continued

Hole no.	Location	Elevation (approx.)	Total depth drilled	Total depth logged
	T. 7 N., R. 80 W., con	tinued,		
C98	sec. 21, NW4NE4	8,218	700	700
C99	sec. 21, $SE^{1}4NW^{1}4$	8,140	840	840
M47	sec. 22, $NE^{1}4NE^{1}4$	8,190	800	800
M12	sec. 22, SW4NE4	8,189	800	800
M100	sec. 22, SW4SW4	8,188	400	400
м6	sec. 23, SE4NE4	8,186	800	800
м36	sec. 24, $NE^{1}4NW^{1}4$	8,183	800	800
M101	sec. 25, SW4NE4	8,230	830	830
M102	sec. 25, SW4SW4	8,200	800	802
M104	sec. 27, $SE^{1}4NW^{1}4$	8,160	240	240
M11	sec. 28, NE4NE4	8,220	800	800
C17	sec. 29, $NE^{1}4NW^{1}4$	8,151	800	800
C19	sec. 31, NW4NW4	8,272	300	298
M108	sec. 35, NW4NW4	8,184	100	98
M109	sec. 35, NE4SW4	8,210	800	651
M110	sec. 35, $NE^{1}_{4}SE^{1}_{4}$	8,220	770	768
	T. 7 N., R. 81 W.,			
T111	sec. 19, SW4SE4	8,370	600	600
T112	sec. 20, SW4SE4	8,240	500	500
C25	sec. 23, NE ¹ 4NE ¹ 4	8,170	200	200
C26	sec. 23, SW4NW4	8,141	220	220
C27	sec. 23, SW4NW4	8,170	600	586
C28	sec. 26, NW4SW4	8,180	400	400
C29	$sec. 26, NE^{1}_{4}SE^{1}_{4}$	8,300	500	500
T115	sec. 29, NW4SE4	8,300	500	500
T116	sec. 30, SE ¹ 4SE ¹ 4	8,435	500	500
C117	sec. 33, SW4SE4	8,930	500	500
C30	sec. 35, NE4NW4	8,200	300	298
C32	sec. 35, NE4SE4	8,360	500	500

Hole No. C2 Map Coalmont		Date logged rema	irks Ele	vation (ft)	8,227
Location: T. 6 N., R. 80 W.	, sec. <u>6</u>	2400 FN L 1550	FEL Core	d: Yes	k] No
Drilled depth 800 Logged d	epth	_Drilling medium_	water Fl	uid level	
Geophysical logs:					
Spontaneous potential (SP):	Scale		Logging	speed	_fpm
Resistivity (RES):	Scale		Logging	speed	_fpm
Gamma (G): T.C	Scale		Logging	sp eed	_fpm
Density (DEN): T.C	Scale		Logging	spee d	_f pm
Remarks: No geophysical 1	ogs, litholo	gy described 7/23/	· · · · · · · · · · · · · · · · · · ·		

	LITHOLOGY	IIP G		G	EOPHYSI	CAL LOGS		DEP	TH
	LITHOLOGI	STRIP LOG	G		SP	RES	DEN	FT	М
0-28	Sandstone, yellowish-gray,				*	······································		0-	- 0
	medium-grained, well-sorted,	l					-	-	
00 00	subrounded, with white mica							-	l
28-33	Mudstone, moderate-brown and				•			-	-10
22 50	medium-dark-gray							_	~~
33-50	Sandstone, medium-dark-gray to	،،،،،، منتند						50-	
	'light-gray, medium-grained,							20	
	subangular to subrounded, well-sorted, with white mica		i					-	-20
50-85	Shale, medium-light-gray, and							-	
JU-0J	shaly mudstone, medium-light-							-	
	gray, and mudstone, medium-								١.
ź	dark-gray; interbedded sand-	l::::						100-	-30
	stone, very light gray, fine-							100	
	grained, well-consolidated,								
	with two micas							-	l
85-105	Sandstone, very light gray,							-	_40
05 105	medium-grained, subrounded,	二二						-	
: *	well-sorted, with white mica				-			150-	
105-120	Mudstone, medium-light-gray;							170	
	interbedded sandstone, very						·		-50
	light gray, fine-grained,								l
	subrounded, well-consoli-	F==1						-	
	dated, with two micas							-	
120-125	Såndstone, very light gray,		٠,٠					200.	-60
	medium-grained, subangular,							200	
	well-sorted, with white mica								
125-130	Sandstone, very light gray,							٦	
	fine-grained to very fine								-7 C
	grained, very well sorted,							. 4	
:* *	well-consolidated, with two				•		1	250-	
•	micas; interbedded shaly mud-				-				ء ۾
•	stone, medium-light-gray	 						7	-80
130-155	Shale, olive-black and medium-	╞╼╡						1	
	gray						i	-	
155-160	Shale, olive-black; medium-gray	<u> </u>			_				00
" ;	* mudstone	Γ^{-}	77.77		2		1	300-	- 70

Hole No. C2 (continued)

	٠.	LITHOLOGY	STRIP LOG	GEC	PHYSI	CAL LOGS		DEPTH		
	•	•	ST	G	SP	RES	DEN	FT	М	
	160-175;	•		3				_		
L	175-180	Mudstone, olive-black	L					_		
							٠,		- 100	
ſ										
Γ	180-210	Mudstone, olive-black; inter-						350-		
r	1	bedded sandstone, white, fine-					ä	200-		
1		grained, well-sorted, well-						-	- 110	
t		consolidated with muscovite						-	İ	
F	210_220	and biotite. Mudstone, olive-black; mudstone,				,		-		
ŀ	210-220	medium-gray; minor interbedded					- 1	_	- 120	
-	. 28	-sandstone, white, fine-			,			400-		
ŀ		grained, well-sorted, well-					1	-		
+		consolidated, with two micas	 					-	_ 130	
-	220-275	Mudstone, olive-black and medium					į	-	130	
-		gray; minor interbedded sand-	L					_		
<u> </u>	.7	stone, white, fine-grained, well-sorted, well-consolidated						450-		
Į.	.*	with two micas; minor carbon-		į			l	_	- 140	
L		aceous shale					- 1	_		
L	275-310	Mudstone, medium-gray to light-			•					
L		gray; interbedded sandstone,				•	I	-	- 150	
L	•	white, fine-grained, well-					1	500	- 130	
	ī	sorted, well-consolidated, with two micas						500-		
ſ		with two micas						-		
Γ	310-365	Mudstone, medium-gray to light-						4	- 160	
Γ		gray; interbedded sandstone,					1	1		
T		medium-light-gray, medium-					- 1			
T	-:	grained, subangular, well-			•		1	550-	- 170	
r		sorted, with white mica; inter-	-				1	4	1,0	
t		bedded sandstone, white, fine- grained, well-sorted, well-					1	. 1		
†		consolidated, with two micas;					1	4		
1		minor carbonaceous shale					İ	-	- 180	
1		Shale, brownish-black					1	600		
+	380-420	Shale, brownish-black, mudstone,	<u> </u>				l	: -		
t		medium-dark-gray; shaly mud-	<u> </u>				1	4	- 190	
+	420-480	stone, medium-light-gray Mudstone, olive-black; mudstone,	L _				l	-	i	
+	720 TOU	medium-dark-gray; shaly mud-					1	-		
-		stone, medium-light-gray						650-	- 200	
-	480-540	Mudstone, olive-black and					1		- 200	
-		medium-dark-gray; shaly mud-					l	4		
-		stone, medium-light-gray;					j	4		
-		interbedded sandstone, white,					1	4	- 210	
		very fine grained, well-sorted, well-consolidated, with two	1					-700-		
		micas								

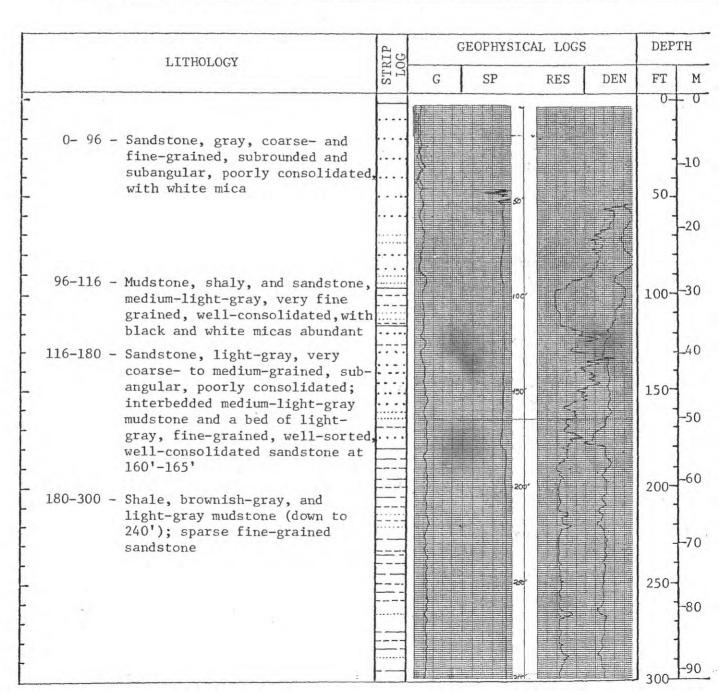
Hole No. C2 (continued)

LITHOLOGY	STRIP LOG	GEOP	HYSICA	L LOGS		DE	PTH
	STI L	G	SP	RES	DEN	FT	М
540-550 Shaly mudstone, medium-light- gray and brownish-black; shale, medium-dark-gray - 550-800 Shaly mudstone, brownish-black						-	- 220
			·		,	750 -	- 230
						- 800	- 240
						-	- 250 ·
						850 <u>-</u>	~ 260
					,	900-	- 270

Hole No. <u>C3</u> (continued)

LITHOLOGY	STRIP	GEOPHYSICAL LOGS				DEPTH	
	STE	G	SP	RES	DEN	FT	М
1							
					ζ,	-	
1 1 1 1 1 1	H				7		- 100
				L., .) [350-	
4			350′)	, ,	330-	- 110
200 500							110
300-502 - Same as above				2		-	
					Ž	400-	- 120
2 × 2 × 2	_ T		400′	7 /	5	400-	_
) }			ý l		120
		(1000	4. 1				_ 130
		<i>\</i>		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Ì.	450-	
		- \ 10 (1	450	ا. پي	(450-	- 140
	-	}		Y			
				<u> </u>		-	
	-			4			- 150
502-550 - Shale and medium-light-gray, fine-grained, subrounded, poorl		}	500′	3	₹	500-	
consolidated sandstone				, <u>, , , , , , , , , , , , , , , , , , </u>		-	_ 160
					j		_ 100
		{					
550-700 - Shale and light-gray, medium- grained, subrounded, poorly	- 3	3	550			550-	- 170
consolidated sandstone, with		· ·		4		-	
white mica, at 681'-682'		1) 		-	
) -)		- 180
3			1 60d	ķ		600	
	目	7)		-	- 190
		 				+	,
	日	}	L, she	i.	\$ \$	(50	
1 1			650		\ }	650-	- 200
		Ì			}	-	
		3		<u> </u>		-	010
	1				$\{ \parallel \}$	- 1	- 210
			/AA .!!!			700-	

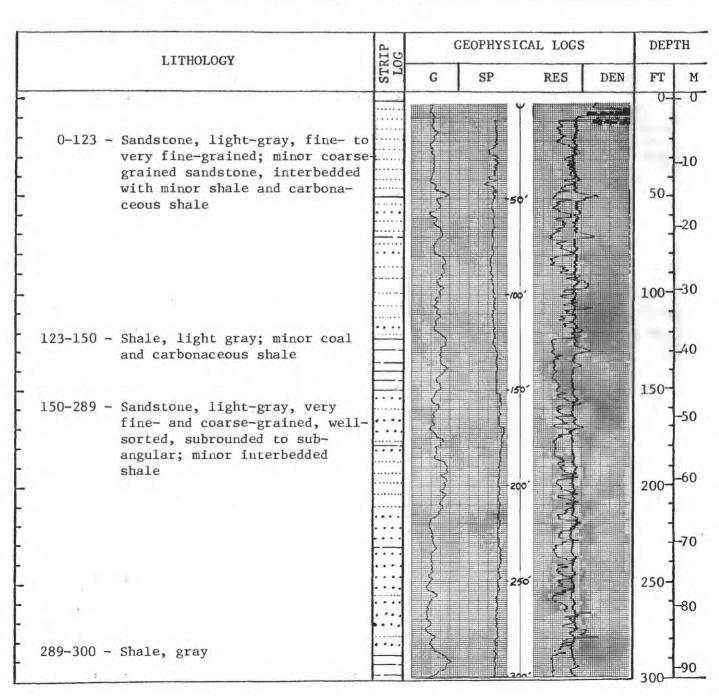
Hole No. C3 Map Coalmont		Date logged 8/7/	77 Elevation	(ft)	3,250
Location: T. 6 N., R. 80 W.,	sec. 6	1500 FWL 150 F	S L Cored:	Yes [No
Drilled depth 800' Logged dep	th 800'	Drilling medium m	ud Fluid le	ve1 <u>52</u>	1
Geophysical logs:					
Spontaneous potential (SP): Se	cale	250 mv/in	Logging speed_	20	fpm
Resistivity (RES):	cale	250 ohms/in	Logging speed_	20	fpm
Gamma (G): T.C. 2 So	cale	400 cps/in	Logging speed_	20	fpm
Density (DEN): T.C. 2	cale	16 Kcps/in	Logging speed_	20	fpm
Remarks:		13			



Hole No. C3 (continued)

LITHOLOGY	GEOPHYSICAL LOGS GEOPHYSICAL LOGS GEOPHYSICAL LOGS GEOPHYSICAL LOGS GEOPHYSICAL LOGS				DEPTH	
311101001	STE	G	SP RES	DEN	FT	М
700-800 - Same as above						- 220
			. 750' - 1		750-	- 230
· · · · · ·	, 1				800-	- 240
						- 250
	ž.	thii			850 -	- 260
					900	- 270

Hole No. M5 Map MacFarlane	Reservoir	Date logged 7/7	/77 Elevation	(ft) ⁸	3,160
Location: T. 7 N., R. 80 W.	, sec. 15	: 350' FSL 550'	FEL Cored:	es X	No
Drilled depth 860' Logged d	lepth 860	Drilling medium	air & Fluid lev	re1_9	
Spontaneous potential (SP):	Scale_	50 mv/in	Logging speed	20	fpm
Resistivity (RES):	Scale	400 ohms/in	Logging speed	20	fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed	20	fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed	20	fpm
Remarks: Twin drilled, co	al cored	in second hole.			



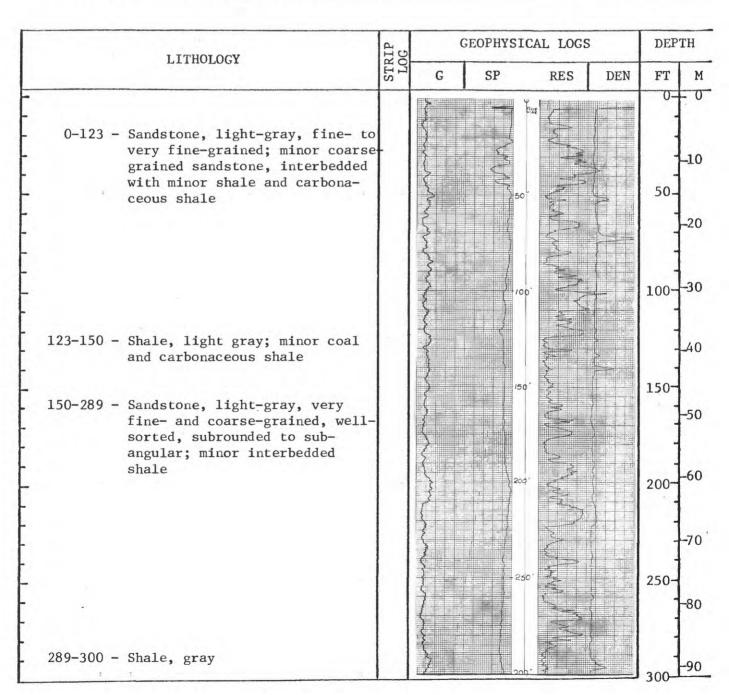
Hole No. M5 (continued)

	T:	THOLOGY		STRIP LOG	GI	GEOPHYSICAL LOGS			DEPTH	
				STE	G	SP	RES	DEN	FT	M
300-378	- Sands	tone and minor to 289')	shale (see			340				- 100
2	Í		i			- J-350´			350-	- 110
378-450		, olive, and ca ; interbedded s -gray) 			400-	- 120
3	er .		ī) 400°	J		400	_ 130
450-700	- Sands	tone and minor to 289')	shale (seę			450′			450-	- 140
3.			í			£ 500 '			500-	- 150
										_ 160
1	1		1	••••		-550'	3		550-	- 170
1			ž			} -600'			600-	- 1 80
				• • • • • • • • • • • • • • • • • • • •		3			-	- 190 ·
1	9	14:	í						650 -	- 200
					}	3 700'			700	- 210

Hole No. M5 (continued)

LITHOLOGY	G	GEOPHYSICAL LOGS				DEPTH	
HIMOHOGI	STRIP	G	SP	RES	DEN	FT	М
700-716 - Sandstone and minor shale (see 150' to 289') 716-741 - Coal, with partings			7 / V				- 220
741-823 - Sandstone, gray, coarse-grained and minor shale			750			750 - -	- 230
			£ 200°			800-	- 240
823-860 - Shale, gray to dark-gray; some sandy shale; thin coal at 848'		<u> </u>	<i>.</i>	2 11 12 2 12 13 14 14 14 14 14 14 14 14 14 14 14 14 14			- 250
						850 –	- 260
							- 270
						900-	L

Hole No. M5 Map MacFarlane Reservoir Date logged 8/6/77 Elevation (ft)8,160' Location: T. 7 N., R. 80 W., sec. 15 : 350' FSL 550' FEL Cored: X Yes No Drilled depth 747' Logged depth 747' Drilling medium water Fluid level 5' Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed 500 ohms/in 20 fpm Logging speed Resistivity (RES): Scale Scale 100 cps/in T.C. 2 20 fpm Gamma (G): Logging speed Density (DEN): T.C. 2 Scale 500 cps/in 20 fpm Logging speed Remarks: Cored interval: 710'-741'



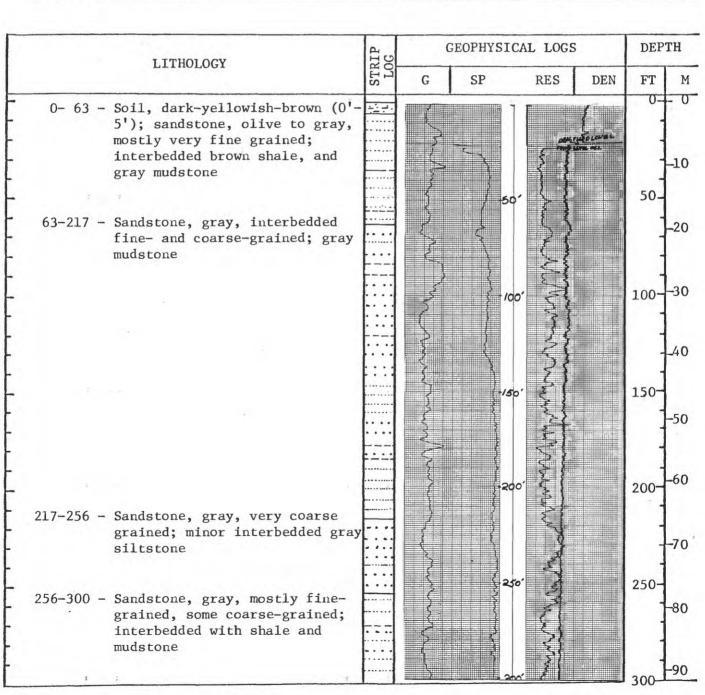
Hole No. M5 (continued)

	LITHOLOGY	RIP	GEOPHYSICAL LOGS GEOPHYSICAL LOGS GEOPHYSICAL LOGS FOR SP RES DE					PTH
		STI	G	SP	RES	DEN	FT	М
300-378 -	Sandstone and minor shale (see 150' to 289')			350′			350-	- 10 - 11
378-450 -	Shale, olive, and carbonaceous shale; interbedded sandstone, light-gray			400			400-	- 12
							-	_ 13
450-700 -	Sandstone and minor shale (see 150' to 289')	2		450			450-	- 1 4
				50p′			500- -	- 15 - 16
		1		550′			550-	- 17
		2		and the second second second			600	- 18
¥				45 0′			650-	- 19 - 20
				700			700	- 21

Hole No. M5 (continued)

		LITHOLOGY		KIP OG	GEOPHYSICAL LOGS				DEPTH	
				STRIP	G	SP	RES	DEN	FT	М
-	700-716 -	Sandstone and minor shale 150' to 289')	(see	3	} }	700				- 220
+	716-741 -	Coal, with partings			3 .					
-	741-747 -	Sandstone, gray, coarse-gr and minor shale	ained,						750 -	- 230
	.,								800-	- 240
-										- 250
-			ı	-	(ni)				850 -	- 260
-								,	900	- 270

Hole No. M6 Map MacFarlane	Reservoir	Date logged 7/1	0/77 Elevation (ft) ^{8,186}
Location: T. 7 N., R. 80 W.	, sec. 2	3: 2,000'FNL 0'	FEL Cored: Yes X No
Drilled depth 800' Logged d	epth 800	Drilling medium	water Fluid level 23'
Geophysical logs:			
Spontaneous potential (SP):	Scale	25 mv/in	Logging speed 20 fpm
Resistivity (RES):	Scale	400 ohms/in	Logging speed 20 fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed 20 fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed 20 fpm
Remarks:			



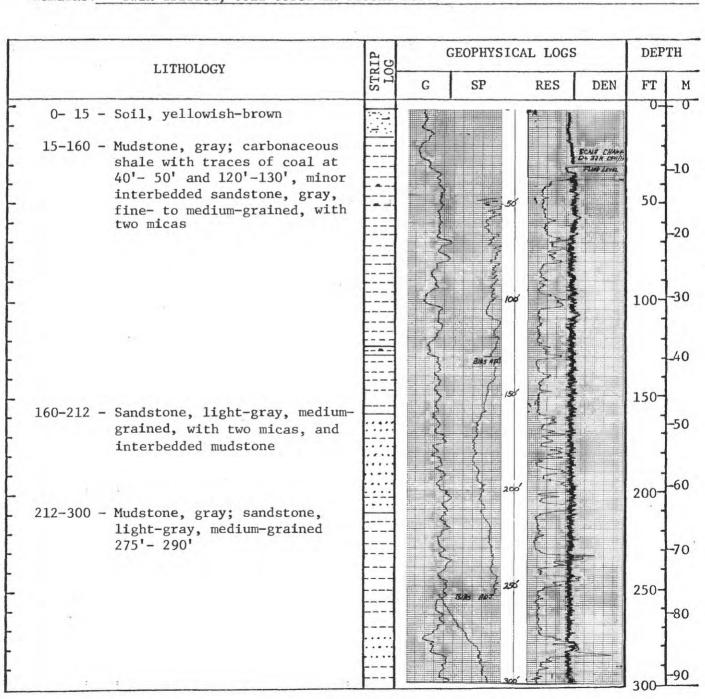
Hole No. M6 (continued)

LITHOL 300-345 - Sandstone,	JG1	STRIP				- 1	DEPTH	
300-345 - Sandstone,		S	G	SP	RES	DEN	FT	М
grained, s	gray, mostly fine ome coarse-grained, d with shale and							- 10
345-363 - Sandstone, fine- to c sorted, su	oarse-grained, well			350			350-	- 11
coarse-to	mostly light-gray, olive-gray, very very fine grained; bedded shale			\$ 400°	What June		400-	- 12
	light-gray, coarse- arse-grained, moder- ed, subangular		}	450			450-	_ 13 _ 14
502-554 - Sandstone, interbedde and minor	d olive-gray shale,			1 5co'			500-	- 15 - 16
with carbo 575-593 - Thin COAL 584', and	ined, interbedded naceous shale		M. M. Wall	\$ 550°	To the state of th		550-	- 17 - 18
593-650 - Sandstone, grained, a gray, very		se-		\$ 600°	The Market of the Control of the Con		600	- 19
	gray, fine- to ained (moderately to ed and angular 670'-			650			650-	- 2°

Hole No. M6 (continued)

LITHOLOGY		RIP	GEOPHYSICAL LOGS				DEPTH	
BITHOLOGI		STRIP	G	SP RES	DEN	FT	М	
700-800 - As above							- 220	
	7			750'		750 -	- 230	
-11 1						800-	- 240	
		-					- 250	
E (A)	f	2	160			850 -	- 260	
						-	- 270	
						900		

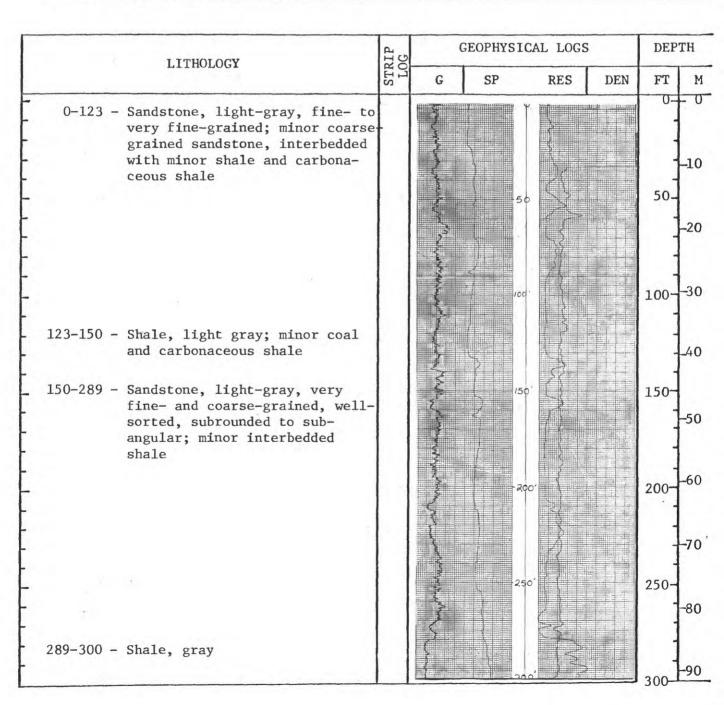
Hole No. C7 Map Coalmont		Date logged 6/1	$\frac{9/77}{\text{Elevation (ft)}} \frac{8,170}{100}$
Location: T. 7 N., R. 80 W.	, sec. 18	: 2,350'FSL 0'	FWL Cored: Yes X No
Drilled depth 600' Logged d	epth 600'	Drilling medium_	water Fluid level 38'
Geophysical logs:			
Spontaneous potential (SP):	Scale	100 mv/in	Logging speed 20 fpm
Resistivity (RES):	Scale	200 ohms/in	Logging speed 20 fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed 20 fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed 20 fpm
Remarks: Twin drilled, coa	1 cored in	second hole.	



Hole No. C7 (continued)

	LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS				DEPTH	
		ST]	G	SP	RES	DEN	FT	M
300-309 - Mu	dstone, gray	-12E	, #15e	s Apt				
	AL; partings of dark-gray dstone and carbonaceous shale			Ž		1		- 10
340-381 - Mu	dstone, gray			350'			350-	- 13
	lty mudstone, medium-light-							
	ay; traces of coal dstone, gray and olive-black			400'			400-	- 1:
	*		A	L MAX				_ 13
				150'			450-	- 1
coa	ndstone, very light gray, arse-grained above 530' and ne-grained below 530'			500'		*	500-	- 1. - 1
				59			550-	- 1
				600				- 1
¥	2	. 1					600-	-1
								_ 1
		- 2					650-	- 2
								- 2
							700-	

Hole No. C7 Map Coalmont		_ Date logged 8/10	0/77 Elevation (ft) 8,170
Location: T. 7 N., R. 80 W.	, sec. 18	: 2350FSL 0	FWL Cored: X Yes No
Drilled depth 340' Logged d	epth 340'	Drilling medium_	water Fluid level 0'
Geophysical logs:			
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed 20 fpm
Resistivity (RES):	Scale	100 ohms/in	Logging speed 20 fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed 20 fpm
Density (DEN): T.C. 2	Scale	3.2 Kcps/in	Logging speed 20 fpm
Remarks: Cored interval:	300'-339'		



Hole No. C7 (continued)

	LITHOLOGY			STRIP LOG	GEOPHYSICAL LOGS				DEPTH	
•	221102002			STF	G	SP	RES	DEN	FT	М
300-340 -	Sandstone and 150' to 289')	minor sha	ale (see	7		340			350	- 100
										- 110
4			· ·			i			400-	- 120
									450-	_ 130
			2	1					450-	- 140
*		ē							500-	- 150 - 160
i			4	T.					550-	– 170
r	-1		.1						600-	– 180
										- 190 ·
									650-	– 200
									700-	- 210

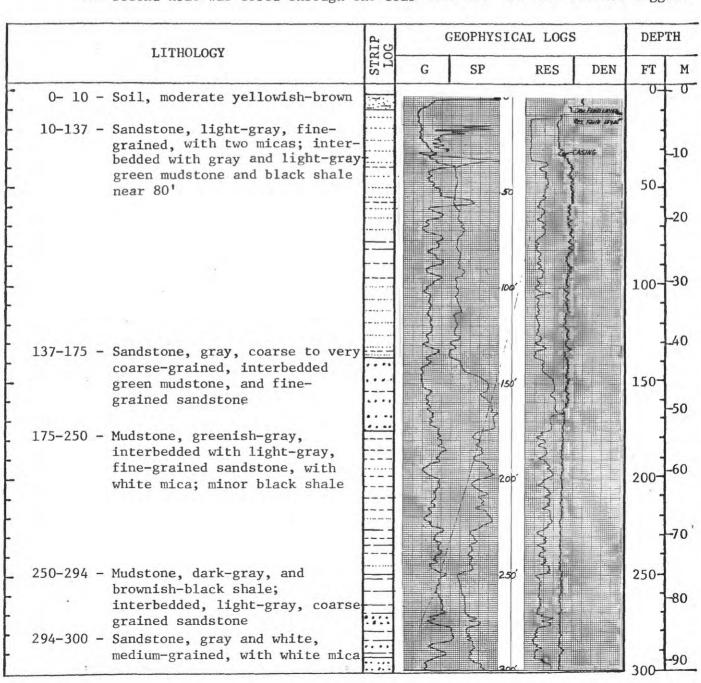
Hole No. C8 Map Coalmont	***	Date logged 6/1	17/77 Elevation	(ft)	8,230
Location: T. 7 N., R. 80 W.	, sec. 19	: 1,125 FNL 0'	FW L Cored:	Yes [X No
Drilled depth 500' Logged d	epth 49	8' Drilling medium	air Fluid le	vel_4	9'
Geophysical logs:					
Spontaneous potential (SP):	Scale	100 mv/in	Logging speed_	20	_fpm
Resistivity (RES):	Scale	1,000 ohms/in	Logging speed_	20	_fpm
Gamma (G): T.C. 4	Scale	200 cps/in	Logging speed_	20	fpm
Density (DEN): T.C. 4	Scale	32 Kcps/in	Logging speed_	20	_fpm
Remarks:					

GIP	G		DEPTH			
STRIP	G	SP	RES	DEN	FT	М
					0-	- 0
			FLA 50		50-	-10
						-20
	3		100		100-	-30
)	-	_4(
			150		150-	-50
			200		200-	-60
		E				
						-70
			250 \ \ \ \ \ \	>	250-	-80
					-	00
	STR			150		50 50 50 - 150 - 2

Hole No. C8 (continued)

	LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS				DE	PTH
		ST	G	SP	RES	DEN	FT	М
300-391 -	As above		The Control of the	350			350 <u>-</u>	- 100 - 110
391-500 -	Sandstone, light-gray, coars grained (medium-grained 391' 400')	e-	John John	100			400-	_ 120
1	•		A September of the sept	150			450-	_ 130 _ 140
	1		£ .	1	I		500-	- 150 - 160
1							550-	- 170
1		3 10 3					600	- 180 - 190
	i i i i i i i i i i i i i i i i i i i	1					650-	- 200
							700	- 210

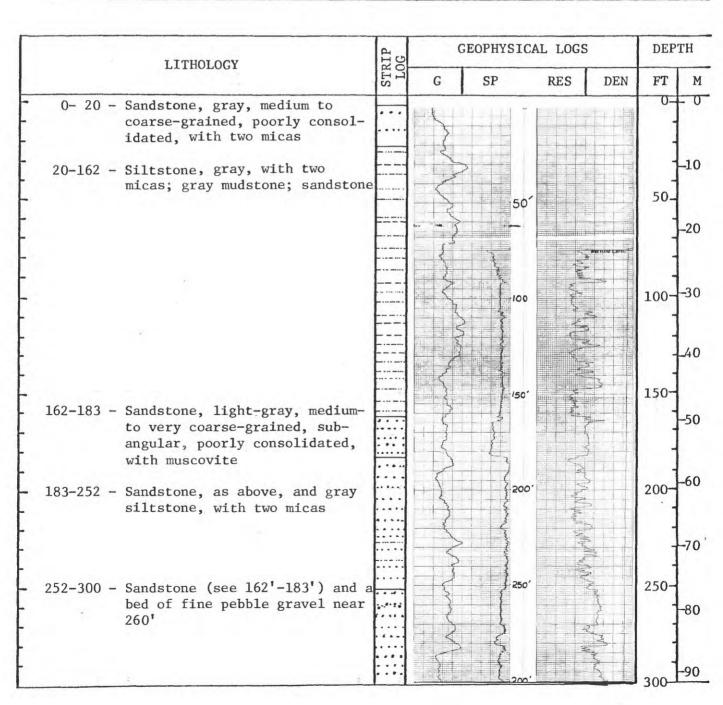
Hole No. C9 Map Coalmont		Date logged 6/28	/77 Elevation (ft)8,190'						
Location: T. 7 N., R. 80 W.	, sec. 19	: 0' FSL1,900'FEL Cored: Yes X No							
Drilled depth 480' Logged de	epth 480'								
Geophysical logs:			gel						
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed 20 fpm						
Resistivity (RES):	Scale	400 ohms/in	Logging speed 20 fpm						
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed 20 fpm						
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed 20 fpm						
Remarks: *C9 was "twin-drille									
the second hole was cor	red through	the coal from 410	to 431' but not logged.						



Hole No. C9 (continued)

LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS				DE	РТН
	STI	G	SP	RES	DEN	FT	М
340-413 - Sandstone, light-gray, very fine- to coarse-grained; minor black shale and coal			350'			350-	- 100 - 110
413-430 - COAL, with parting			1400			400-	- 120
430-457 - Sandstone, light-gray to white, very fine- and medium-grained							_ 130
457-480 - Shale, medium-gray and black			450'			450- -	- 140
		•	1		***	500-	- 150 - 160
4 1						550-	– 170
						600-	- 180
3 Y 3						650 -	- 190 - 200
		The state of the s				700	- 210

Hole No. Mll Map MacFarlane Reservoir Date logged 8/3/77 Elevation (ft)8,220' Location: T. 7 N., R. 80 W., sec. 28 : 250' FN L 950' FE L Cored: Tyes No Drilled depth 800' Logged depth 800' Drilling medium mud Fluid level 75' Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed Scale 100 ohms/in 20 fpm Resistivity (RES): Logging speed_ T.C. 2 Scale 500 cps/in 20 fpm Gamma (G): Logging speed 64 Kcps/in 20 fpm Density (DEN): T.C. 2 Scale Logging speed Remarks:



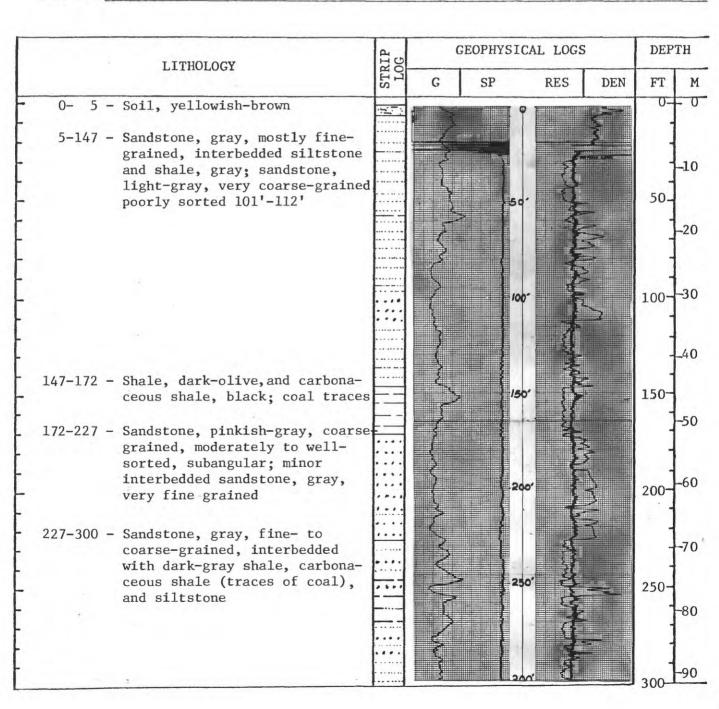
Hole No. M11 (continued)

LITHOLOGY	STRIP LOG	GEO	PHYSICAL	LOGS		DE	PTH
	STI L(G	SP	RES	RES DEN		М
300-301 - As above 301-392 - Sandstone (see 162'-183') interbedded with light-gray silt-stone, two micas, and light-			J. A.				- 10
gray mudstone			350			350_	- 11(
392-411 - COAL; partings of black shale and mudstone			400			400-	_ 120
411-558 - Mudstone interbedded with sand- stone (white mica, some biotite and shale; traces of coal 520'-							_ 130
530 '		}	{ 450'			450-	- 140
			5 600'			500	- 150
							- 160
558-590 - Sandstone, white, fine- and very coarse-grained, subangular to angular, poorly consolidated, with white mica			550'			550-	- 170
590-617 - Mudstone, light-gray 617-700 - Sandstone with white mica, and			600′			600	- 180
mudstone							- 190 ,
			5650'			650	- 200
			} } }			700	- 210

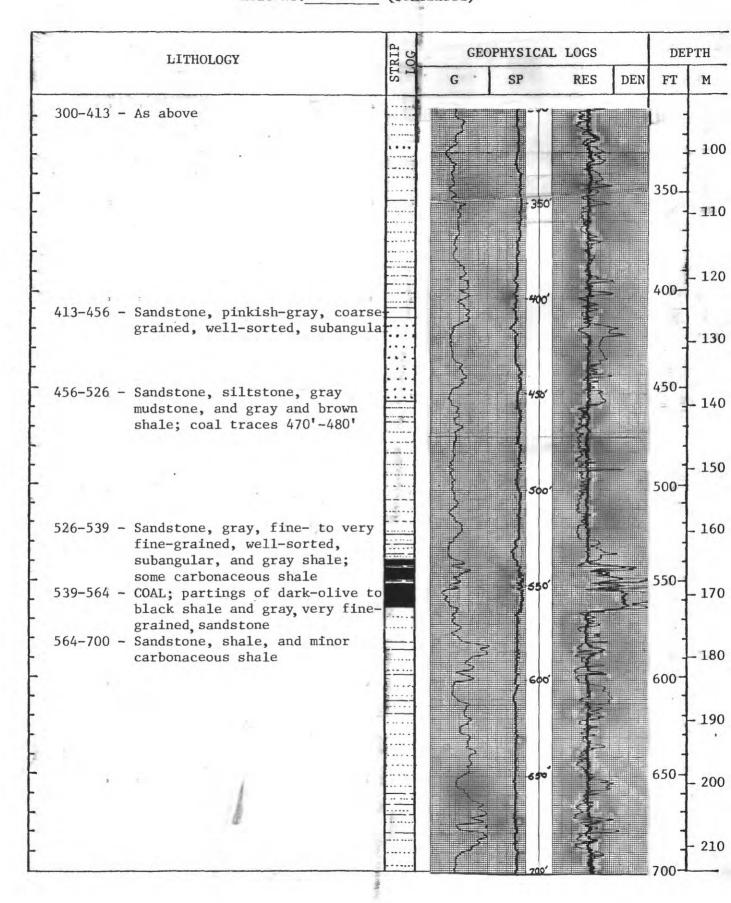
Hole No. M11 (continued)

LITHOLOGY	RIP	GEOPHYSICAL LOGS				DEPTH	
HIIIOHOOI	STRIP	G	SP	RES	DEN	FT	М
700-800 - As above			**************************************	W.Com	70.		- 220
		o linde	750'			750 -	- 23
						800-	- 241
							- 25(
u i	i Î	hli				850 –	- 260
						900	- 270

Hole No. M12 Map MacFarlane	Reservoir	Date logged 7/20)/77 Elevation	(ft) ^{8,189}
Location: T. 7 N., R. 80 W.	, sec. 2	22 : 2,050'FN L 1,900'	FEL Cored: Y	es X No
Drilled depth 800' Logged d	epth 800	Drilling medium_	water Fluid lev	el
Geophysical logs:				
Spontaneous potential (SP):	Scale_	50 mv/in	_ Logging speed	20 fpm
Resistivity (RES):	Scale_	400 ohms/in	Logging speed_	20 fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed	20 fpm
Density (DEN): T.C. 2	Scale_	64 Kcps/in	Logging speed_	20 fpm
Remarks:				



U.S. GEOLOGICAL SURVEY DRILL-HOLE LOG, JACKSON COUNTY, COLORADO Hole No. M12 (continued)



Hole No. M12 (continued)

110	GEOPHYSICAL LOGS					PTH
STR	G	SP	RES	DEN	FT	М
						- 220
		795'			750 -	- 230
	}				- 800-	- 240
	÷				1	- 250
2	e-23				850 –	- 260
						- 270
	STRIP	STR B C C C C C C C C C C C C C				750-

Hole No. C17 Map Coalmont		Date logged 6/29	/77 Elevation	$(ft)^{8,15}$
Location: T. 7 N., R. 80 W.	, sec. 29	: 0 FSL2,000'	FW L Cored:	Yes X No
Drilled depth 800' Logged d	epth_800'	Drilling medium_	mud Fluid le	vel_9'
Geophysical logs:				
Spontaneous potential (SP):	Scale		Logging speed_	20 fpm
Resistivity (RES):	Scale40	00 ohms/in	_ Logging speed_	20 fpm
Gamma (G): T.C. 2	Scale 20	00 cps/in	Logging speed_	20 fpm
Density (DEN): T.C. 2	Scale6	64 Kcps/in	Logging speed_	20 fpm
Remarks:				

	T TENION OF THE	G IP	G	EOPHYSI	CAL LOGS		DEP	TH
	LITHOLOGY	STRIP LOG	G	SP	RES	DEN	FT	1
0- 10 -	Gravel				Y L	MACONI PLORE	0-	
10- 63 -	Siltstone, gray, with white mica; yellowish-gray, fine-grained sandstone, with white mica, and greenish-gray mudstone				50'	Aw Aw	- 50-	-1
63- 98 -	Sandstone, light-gray, coarse- grained; interbedded sandstone, light-gray, fine-grained, with two micas						-	-2
98-122 -	Sandstone, light-gray, fine- grained, with two micas, and gray mudstone		Ì	-10	o' { }		100-	-3
	Mudstone and coaly shale		Ş					_4
135-212 -	Sandstone, light-gray, medium- and coarse-grained, with two micas; and gray mudstone		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	- - - - - - - - - -			150-	-5
			Š	-20	00'		200-	-6
212-300 -	Sandstone, gray and white, medium-grained, some coarse- grained, with two micas; minor black shale							-7
				-29	50'		250-	-8
			5	Į			300	-9

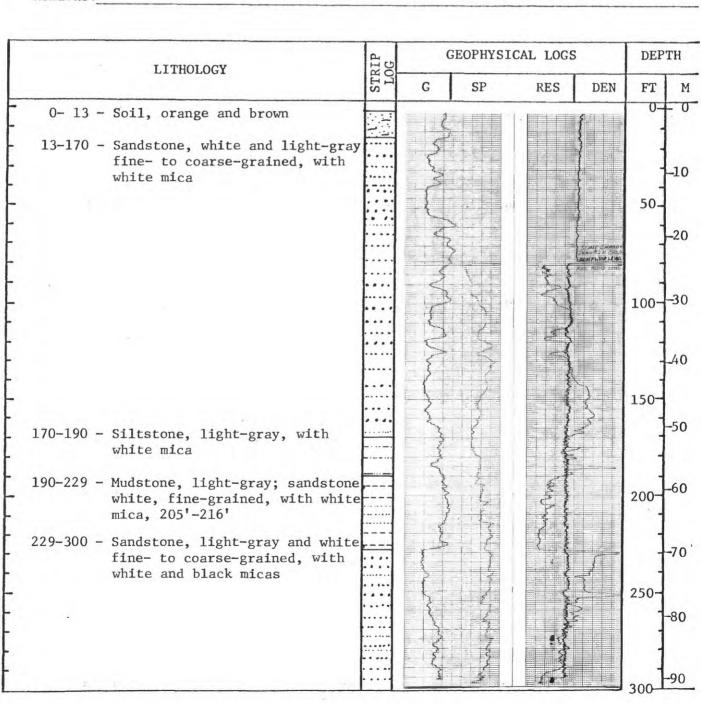
Hole No. C17 (continued)

	LITHOLOGY	STRIP LOG	GEOPHYSICAL LOGS				DE	PTH
		STI	G	SP	RES	DEN	FT	М
	· Ås above · Siltstone, greenish-gray			7300				
333-405 -	Sandstone, light-gray, coarse- to fine-grained; light-gray siltstone, and medium-light-						350-	- 100
	gray mudstone			350				- 110
405-420 -	Shale, brownish-black; silt-			400'			400-	- 120
/20 515	stone, light-gray, and white, fine-grained sandstone Sandstone, light-gray, very							_ 130
420-313 -	fine to coarse-grained			450´		}	450-	- 140
				500′			500-	- 150
515-549 -	Mudstone, olive-gray				}			_ 160
549-700 -	Sandstone, light-gray, fine to coarse-grained; minor inter-bedded gray mudstone			\$55b [′]			550-	– 170
		::: :-:::	3	5600′			600-	_ 180
	1							- 190
4	1		3	650			650-	<u>-</u> 200
			Town March	700/			700	- 210

Hole No. C17 (continued)

LITHOLOGY	RIP	GEOP	HYSICAL	LOGS		DE	PTH
H11110H061	STRIP	G	SP	RES	DEN	FT	М
700-800 - As above				2			- 220
			750'			750-	- 230
		- } -	.000	5		800-	- 240
						950	- 250
4		int.	14			850 -	- 260
						900	- 270

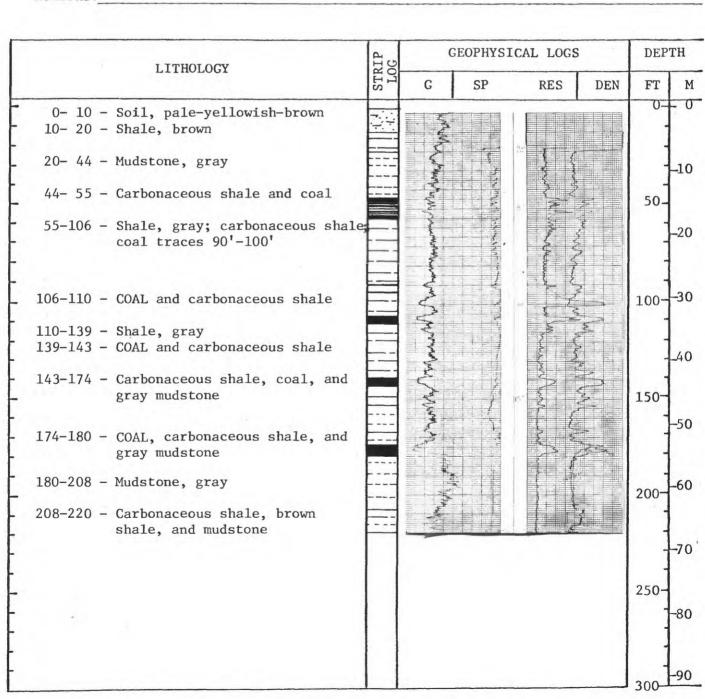
Hole No. C19 Map Coalmont		Date logged 6/20)/77 Elevation	(ft)8,	272
Location: T. 7 N., R. 80 W.	, sec. 31	550' FNL 400'	FW L Cored:	Yes K	No
Drilled depth 300' Logged d	epth 298	Drilling medium_	water Fluid le	ve179'	
Geophysical logs:					
Spontaneous potential (SP):	Scale_	50 mv/in	_ Logging speed_	20 f	pm
Resistivity (RES):	Scale_	400 ohms/in	_ Logging speed_	20 f	рm
Gamma (G): T.C. 2	Scale_	200 cps/in	Logging speed_	20 f	рm
Density (DEN): T.C. 2	Scale_	64 Kcps/in	_ Logging speed_	20 f	pm
Remarks:					



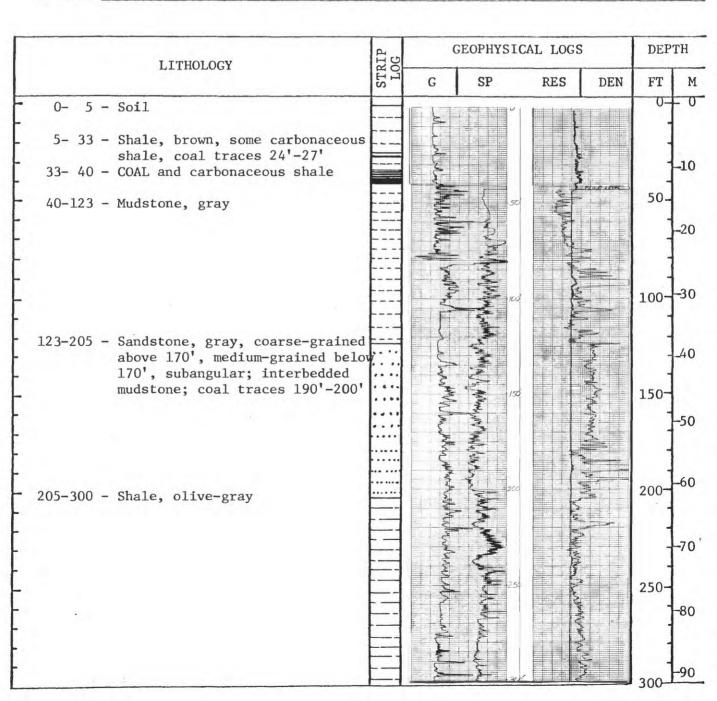
Hole No. C25 Map Coalmont	Date logged 8/4	/77 Elevation (ft) 8,170
Location: T. 7 N., R. 81 W.	, sec. 23 : 400' FN L 600'	FE L Cored: Yes X No
Drilled depth 200' Logged d	epth 200' Drilling medium	air Fluid level 23'
Geophysical logs:		
Spontaneous potential (SP):	Scale 25 mv/in	Logging speed 20 fpm
Resistivity (RES):	Scale 250 ohms/in	Logging speed 20 fpm
Gamma (G): T.C. 2	Scale 500 cps/in	Logging speed 20 fpm
Density (DEN): T.C. 2	Scale 4,000 cps/in	Logging speed 20 fpm
Remarks:		

LITHOLOGY	GEOPHYSICAL LOGS					DEPTH	
LIINOLOGI	STRIP LOG	G	SP	RES	DEN	FT	I
0- 25 - Clinker 25-155 - Mudstone, gray, and gray shale	^^^			Phot 32 minutes	}	0-	- (
			7.	50		- 50-	-10
							-20
						100-	-30
				7			4
155-182 - Sandstone, white, fine-grained, well-sorted, with two micas		and the state of t				150-	-5
182-192 - Shaly mudstone, olive-black 192-200 - Sandstone (see 155'-182')						200-	-6
							-7
						250~	-8
						300	-9

Hole No. C26 Map Coalmont		Date logged 6/1	L6/77 Elevation	(ft)	8,141'
Location: T. 7 N., R. 81 W.	, sec. 23	3 : 2,600'FNL 0'	FW L Cored:	Yes [X No
Drilled depth 220' Logged d	lepth 220	Drilling medium	air & Fluid le	vel_1	8'
Geophysical logs:			water		
Spontaneous potential (SP):	Scale	100 mv/in	Logging speed_	20	_fpm
Resistivity (RES):	Scale_	1,000 ohms/in	Logging speed_	20	fpm
Gamma (G): T.C. 4	Scale	200 cps/in	Logging speed_	20	_fpm
Density (DEN): T.C4	Scale_	6.4 Kcps/in	Logging speed_	20	_f pm
Remarks:					



Hole No. C27 Map Coalmont		Date logged 8/11	/77 Elevation	(ft)	8,170'
Location: T. 7 N., R. 81 W.	, sec. 2	3 : 2,100'FN L1,250'	F WL Cored:	les [X No
Drilled depth 600' Logged d	lepth 586	Drilling medium_	water Fluid lev	re1_	43'
Geophysical logs:					
Spontaneous potential (SP):	Scale	50 mv/in	_ Logging speed	20	_fpm
Resistivity (RES):	Scale_	50 ohms/in	_ Logging speed_	20	_fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed_	20	fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	_ Logging speed	20	_fpm
Remarks:					



Hole No. C27 (continued)

	LITHOLOGY		STRIP	GEO	OPHYSICA	AL LOGS		DE	PTH
			STI L(G	SP	RES	DEN	FT	M
300-600 - As	above .			John Mary John John John John John John John John	350′			350-	- 10 - 13
					- 4a			400	- 12
									_ 13
y - 1				M J	4-55	\$700 M		450- - -	- 1
								500-	- 1
								-	- 1
1 1					52			550-	- 1
				and I have	Took or the second seco			600-	-1
									- 1
		1	1		X			650-	- 2
								700	- 2

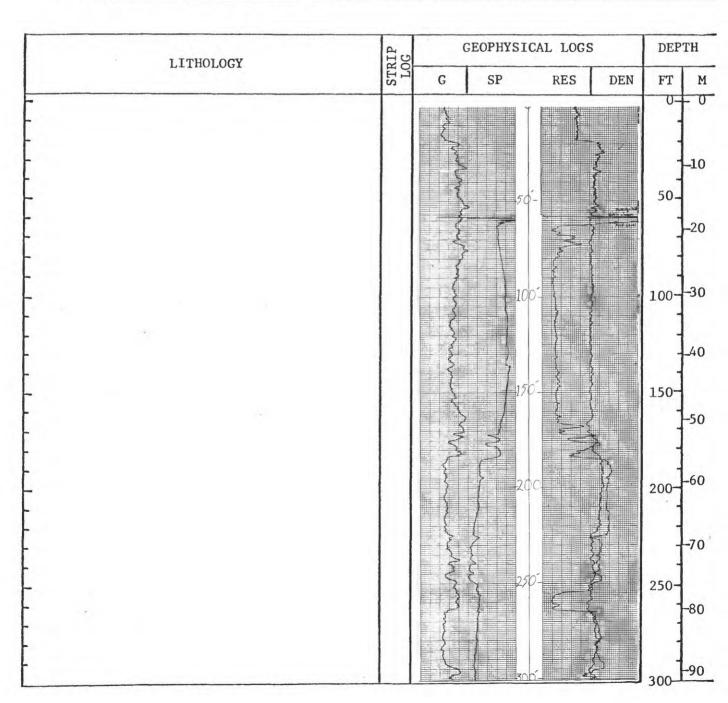
Hole No. C28 Map Coalmont Elevation (ft)8,180' Date logged 8/16/77 Location: T. 7 N., R. 81 W., sec. 26 :1,300'FS L 800' FW L Cored: Yes X No Fluid level 12' Drilled depth 400' Logged depth 400' Drilling medium water Geophysical logs: 50 mv/in 20 Spontaneous potential (SP): Scale Logging speed fpm 100 ohms/in 20 Logging speed Resistivity (RES): Scale fpm 200 cps/in T.C. 2 20 Gamma (G): Scale fpm Logging speed 3.2 Kcps/in Density (DEN): T.C. 2 20 Scale Logging speed fpm Remarks: No lithology log.

I TEUOLOGY	E E	C	GEOPHYSICAL LOGS				TF
LITHOLOGY	STRIP LOG	G	SP	RES	DEN	FT	
		1	Fl.		AM SAMP FISHING	0-	F
					}		-
		\$	1	¢-		50-	
		\$	101 102				-
			10	001		100-	_
0							
			13				1
*1		}	1			150-	-
		18					
		1 35	20			200-	-
		{ }					
			25	0		250 -	
		***	*				-
		}					

Hole No. C28 (continued)

	LITHOLOGY	STRIP LOG	GEOP	HYSICAL	HYSICAL LOGS		DEPTH	
		STI	G	SP	RES	DEN	FT	М
				2 300			350-	- 100 - 110
					Creation of the control of the contr		400-	- 120
	Y			. 7				_ 130
		:					450-	- 140
				ŧ			500-	- 150
1 7							550-	- 160 - 170
							600	180 190
3 2				1			650-	- 200
							700-	- 210

____ Date logged 8/17/77 Hole No. C29 Map Coalmont Elevation (ft)8,300' Location: T. 7 N., R. 81 W., sec. 26:1,950'FSL1,150'FEL Cored: Yes X No Drilled depth 500' Logged depth 500' Drilling medium water Fluid level 61' Geophysical logs: 50 mv/in Spontaneous potential (SP): Scale 20 Logging speed fpm 100 ohms/in 20 Resistivity (RES): Scale Logging speed fpm 200 cps/in T.C. 2 Gamma (G): 20 Scale Logging speed fpm Density (DEN): T.C._2 3.2 Kcps/in 20 Scale fpm Logging speed Remarks: No lithology log.



Hole No. C29 (continued)

LITHOLOGY	STRIP	GEOPHYSICAL LOGS					PTH
	STI	G	SP	RES	DEN	FT	М
			350-			350 -	- 10 - 11
			700-			400-	- 12
	2		-450-			450-	_ 13 _ 14
	2	EALINE TO SELECT	· snoć			500-	- 15 - 16
						550-	- 17
						600	18 19
						650-	- 20
						700-	- 21

Hole No. C30 Map Coalmont		Date logged 6/22	2/77 Elevation (ft)8,200'
Location: T. 7 N., R. 81 W.	, sec. 35	. 700 FNL 1400	FWL Cored: Yes X No
Drilled depth 300' Logged d	epth 298'		air & Fluid level 8' water
Geophysical logs:			
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed 20 fpm
Resistivity (RES):	Scale	200 ohms/in	Logging speed 20 fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed 20 fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed 20 fpm
Remarks:			

49-148 - Sandstone, light-gray, mostly fine-grained, some medium-grained, with white mica; mudstone at 81' 148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine-and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone	I I THINK O CIV	IP	G	EOPHYSI	CAL LOGS	}	DEP	TH
8- 35 - Sandstone, light-gray, fine-grained 35- 49 - Mudstone, medium-dark-gray 49-148 - Sandstone, light-gray, mostly fine-grained, some medium-grained, with white mica; mudstone at 81' 148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine-and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone	LITHOLOGY	STR	G	SP	RES	DEN	FT	
grained 35- 49 - Mudstone, medium-dark-gray 49-148 - Sandstone, light-gray, mostly fine-grained, some medium-grained, with white mica; mudstone at 81' 148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine-and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone		÷::4			pan-ruid i.i.		0-	-
49-148 - Sandstone, light-gray, mostly fine-grained, some medium-grained, with white mica; mudstone at 81' 148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine-and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone	grained		3				-	-1
grained, with white mica; mudstone at 81' 148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine-and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone	49-148 - Sandstone, light-gray, mostly		1	50	, }	3	50-	
148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine- and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium- grained sandstone 200- 250-	grained, with white mica; mud-		3				-	-2
148-156 - Mudstone, medium-gray 156-183 - Sandstone, light-gray, fine- and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium- grained sandstone 183-300 - Mudstone, medium-gray, shaly; and gray fine- and medium- grained sandstone				100			100-	-3
156-183 - Sandstone, light-gray, fine-and medium-grained, with two micas and minor interbedded gray mudstone 183-300 - Mudstone, medium-gray, shaly; and gray, fine- and medium-grained sandstone							-	-4
and gray, fine- and medium- grained sandstone	156-183 - Sandstone, light-gray, fine- and medium-grained, with two micas and minor interbedded			/50		<i>P</i>	150-	-5
250-	and gray, fine- and medium-		100 July 100	120	p' .		200-	-6
		===					-	-7
				25	0 1		250-	-8

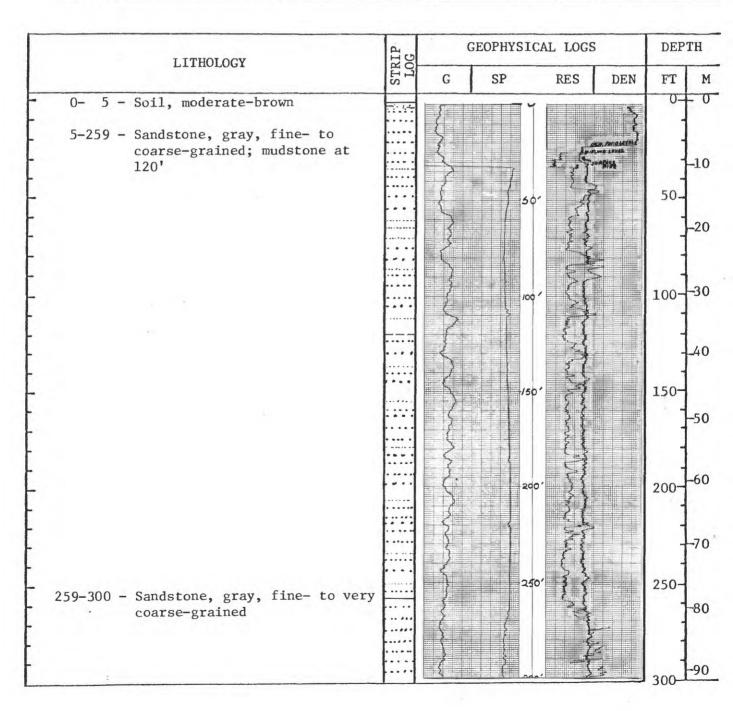
Date logged 6/21/77 Hole No. C32 Map Coalmont Elevation (ft)8,360' Location: T. 7 N., R. 81 W., sec. 35 :1,350'FS L 300' FE L Cored: Yes X No Drilled depth 500' Logged depth 500' Drilling medium air & Fluid level 127' Geophysical logs: 50 mv/in Spontaneous potential (SP): Scale Logging speed 20 fpm 20 Resistivity (RES): 200 ohms/in Logging speed Scale fpm T.C. 2 200 cps/in 20 Gamma (G): Scale Logging speed fpm 64 Kcps/in 20 Density (DEN): T.C. 2 Scale Logging speed fpm Remarks.

I Imiloi ooy	GIP	G	EOPHYSI	CAL LOGS	5	DEP	TH
LITHOLOGY	STRIP	G	SP	RES	DEN	FT	1
0- 5 - Soil, moderate-brown	ilişti.ci	3				0-	-
5- 20 - Clay		}					
20-210 - Sandstone, gray, fine- to coarse-grained, with white mick	a	Ş				- 50-	-1
			5	0'		30-	-2
		1				-	
		}	-//	ρφ'		100-	-3
					SECRETARY OF THE SECRET		4
			بر - ا ا	ø' 1		150-	-5
			3		3		-
210-225 - Mudstone, medium-light-gray,			20	op'		200-	-6
and sandstone 225-300 - Sandstone, very light-gray, fine- to medium-grained, and		}					-7
gray mudstone			2.	50'		250-	
+			2				-8

Hole No. C32 (continued)

LITHOLOGY	STRIP	GE	OPHYSIC	AL LOGS		DE	РТН
	STI L(G	SP	RES	DEN	FT	М
300-339 - As above							- 100
339-500 - Sandstone, white, coarse- to fine-grained, with white mica			3.50			350-	- 110
•			100			400-	– 120
						-	_ 130
	. · · · · · · · · · · · · · · · · · · ·		450'		> > 	450-	- 140
						500-	- 150
						-	- 160
1						550-	– 170
						600	_ 180
							- 190
· · · · · · · · · · · · · · · · · · ·			1			650	- 200
						700	- 210

Hole No. M35 Map MacFarlane Reservoir Date logged 7/1/77 Elevation (ft)8,161' Location: T. 7 N., R. 80 W., sec. 14:1,350'FNL2,000'FWL Cored: Yes No Drilled depth 600' Logged depth 600' Drilling mediumwater- Fluid level 23' Geophysical logs: 100 mv/in 20 Spontaneous potential (SP): Scale fpm Logging speed 200 ohms/in Resistivity (RES): 20 Scale fpm Logging speed 200 cps/in T.C. 2 20 Gamma (G): fpm Scale Logging speed 64 Kcps/in Density (DEN): T.C. 2 20 Scale Logging speed fpm Remarks:



Hole No. M36 Map MacFarlane	Reservoir	_ Date logged 7/8	/77 Elevation	(ft)	8,183'
Location: T. 7 N., R. 80 W.	, sec. 24	:1,000' FNL 1,300	FWL Cored:	Yes X	No
Drilled depth 800' Logged d	epth 800'	Drilling medium_	water Fluid lev	vel_0	·
Geophysical logs:					
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed	20	_fpm
Resistivity (RES):	Scale	400 ohms/in	Logging speed	20	_fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed	20	fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed	20	_f pm
Remarks:	*				

	I IEROT OCA	IP	C	SEOPHYSI	CAL LOGS		DEP	TH
	LITHOLOGY	STRIP	G	SP	RES	DEN	FT	1
31- 42 -	Sandstone, yellowish— to greenish—gray, fine— to coarse-grained, well—sorted, sub—angular Sandstone, light—gray, very coarse—grained, moderately sorted, subangular Sandstone, gray, fine— to			7	o'		50-	-10
	coarse-grained; interbedded dark-gray shale (130'-143')			\$ \$ }	All Charten in the last		100-	-30
143–197 –	Sandstone, gray, coarse-grained well-sorted				A Marine Control of the Control of t		150- -	4 5
197-267 -	Sandstone, gray, fine- to coarse-grained; interbedded dark-gray shale			-20			200-	6 7
267-300 -	Sandstone, gray, fine- to coarse-grained; interbedded dark-gray shale			-2	TO THE TANK		250-	-8

Hole No. M35 (continued)

LITHOLOGY	STRIP LOG	GEC	PHYSICAL	L LOGS		DE	PTH
	STI	G	SP	RES	DEN	FT	M
300-600 - Sandstone, gray, fine- to very coarse-grained		}	340	The state of the s		350-	- 100
		}	350′			-	- 11
1 :			400′	H		400 -	- 12
							_ 13
			450			450-	- 14
			-500′			500	- 15
			-550´			550-	- 16 - 17
			3	3		600	– 18
							- 19
						650-	- 20
						700	- 2

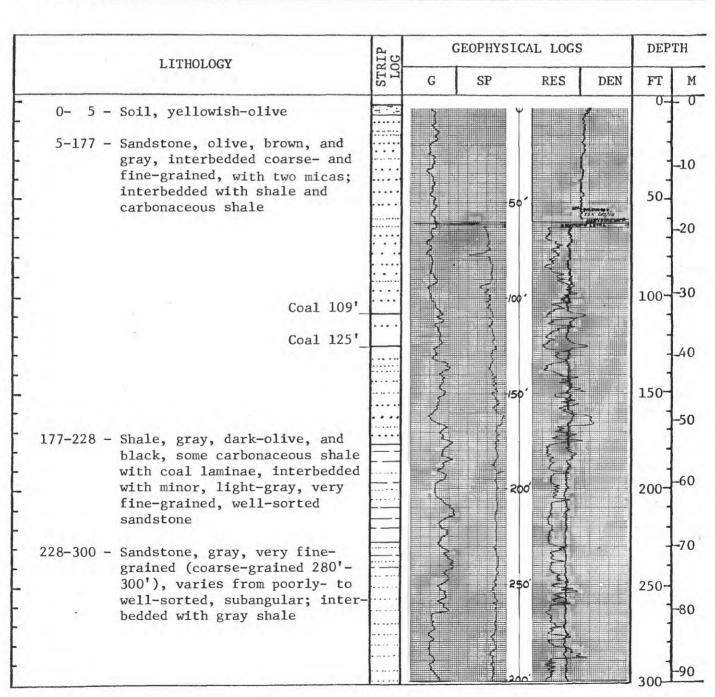
Hole No. M36 (continued)

LITHOLOGY		12 8	GEOPHYSICAL LOGS				DEPTH	
		STRIP	G	SP	RES	DEN	FT	М
300-356 -	As above							
					$\leq \zeta$			
								- 1
			1		[
					31		350-	
356-378 -	Sandstone, light-gray, very		3	- 35	o' 🗲 🕌			- 1
	coarse-grained, subangular, poorly consolidated below 366'				3			- 1
378-457 -	Sandstone, light-gray, fine- to	:						
	coarse-grained, poorly sorted,							
	subrounded to subangular,						100	- 1
	poorly consolidated, inter-	::::		400	' } {		400-	
	bedded with shaly sandstone,	::::::	7		\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\			
	dark-gray, fine-grained sandstone, and carbonaceous							_ 1
	shale; coal traces				1			
	, , , , , , , , , , , , , , , , , , , ,	••••		7	75			
457-511 -	Sandstone, gray, fine- to		7	1-45			450-	-1
	coarse-grained, moderately		3		₹ }		1	- 1
	sorted, interbedded with carbonaceous shale and coal		h h				1	
	traces		>				1	
			3	i i				- 1
511_525 _	COAL, carbonaceous shale, and		3	-500	有我		500-	
J11-J2J -	light-gray, fine-grained		3	Į.		5	1	
	sandstone						1	- 1
525-591 -	Sandstone, light gray, fine-		1		31		1	
	grained; dark-olive shale, and						1	
	carbonaceous shale			\$ 550			550-	- 1
	*			1	\$ 5		1	-
				1]		. 1	
					17 P		1	7
591-626 -	Sandstone, light-gray, very			4	- 1			- 1
1	coarse-grained, well-sorted, subangular	::::		-600			600	
	Subangular		7		14			
626-700 -	Sandstone, light-gray, fine-			ş			1	- 1
	to very coarse-grained, ranging				\$ 1 t		1	
	from poorly to well-sorted;				[] F.	AME AMAGE		
1	interbedded gray shale, and carbonaceous shale		P	650	` \$\\		650	- 2
	Carbonaceous snare				£ 3		1	
							1	
			3		3 7		1	2
					1 1		7	- 2

Hole No. M36 (continued)

	LITHOLOGY	LIP	GEOP	HYSICAL	LOGS		DE	PTH
	Elliologi	STRIP	G	SP	RES	DEN	FT	М
700-800 -	Sandstone, fine- to coarse- grained, well-sorted, subangula to subrounded	r						- 220
			- 127 - 127	750	1		750 –	- 230
*1	1			900			800-	- 240
								- 250
	1						850 -	- 260
							900-	- 270 ·

Hole No. M41 Map MacFarlane Reservoir Date logged 7/13/77 Elevation (ft)8,211' Location: T. 7 N., R. 80 W., sec. 15 : 250' FSL1,950'FW L Cored: Yes X No Drilled depth 840' Logged depth 840' Drilling medium water Fluid level 63' Geophysical logs: 25 mv/in 20 fpm Spontaneous potential (SP): Scale Logging speed Scale 400 ohms/in 20 fpm Resistivity (RES): Logging speed Scale 200 cps/in T.C. 2 20 fpm Gamma (G): Logging speed Density (DEN): T.C. 2 Scale 64 Kcps/in Logging speed 20 fpm Remarks:



Hole No. M41 (continued)

		LITHOLO	OGY		STRIP LOG	GE	OPHYSICA	L LOGS		DE	PTH
					STI	G	SP	RES	DEN	FT	M
-	300-328 -	As above		-		- \$				_	
	328-341 -	Shale, dar	k-olivè-gray us shale	, and		\$					- 10
1.1	341-518 -	Sandstone, fine- and gray shale	gray, inter coarse-grain	bedded ed;			350′ \$			350-	- 11
	*	1		1			} { 400'			400-	- 1 2
							\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				_ 13
	¥						450		The second	450- -	- 14
5	518-700 -	moderately	gray, fine- well-sorted	grained,		}	} 500'			500-	- 15
	-	angular					5 5-550			550-	- 16 - 17
											_ 18
	2	1		1	; ; ;		\$ 600°			600	- 19
							₹ ₹ 6 \$2'			650	- 20
										700	- 21

Hole No. M41 (continued)

LITHOLOGY	GIP	GEOI	PHYSICAL	LOGS		DE	PTH
HIIIODOGI	STRIP	G	SP	RES	DEN	FT	М
700-730 - As above	······································	Ž					
730-756 - COAL; partings of gray, fine- grained, well-sorted, sub-		3	<u> </u>				- 220
angular sandstone 756-840 - Sandstone, gray, fine-grained,		E	750'			750 -	- 230
well-sorted, subangular		A.				,	
			800′			800-	- 240
		Š	3				- 250
			Lauré				
	-	nii				850 -	- 260
						1	- 270
						900	

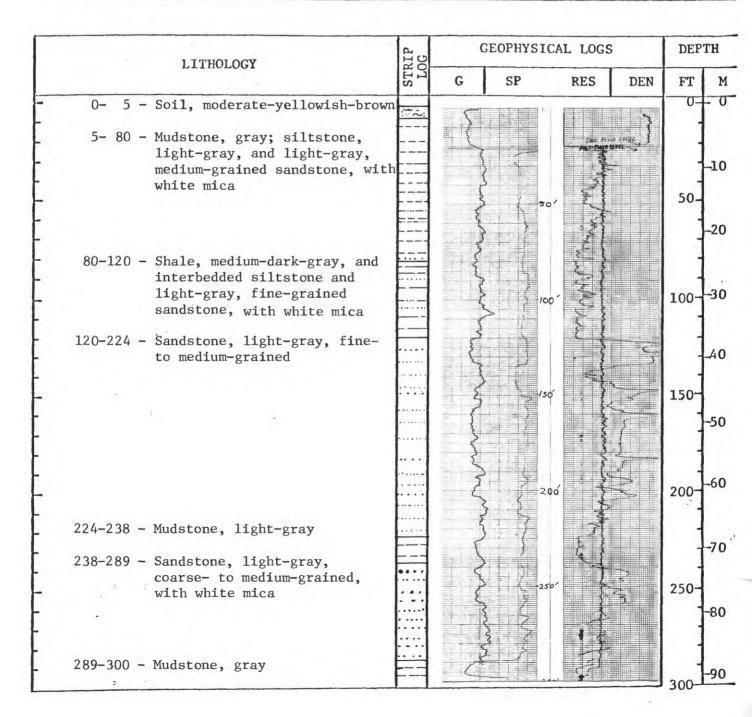
Hole No. C43 Map Coalmont		Date logged 6/1	8/77 Elevation	(ft)8,207
Location: T. 7 N., R. 80 W.	, sec.	19 : 1,150' _F N _L 850'	FW L Cored:	Yes X No
Drilled depth 300' Logged d	epth 30	O' Drilling medium	water Fluid lev	ve126'
Geophysical logs:				
Spontaneous potential (SP):	Scale_	100 mv/in	Logging speed	20 fpm
Resistivity (RES):	Scale_	1,000 ohms/in	Logging speed	20 fpm
Gamma (G): T.C. 4	Scale_	200 cps/in	Logging speed	20 fpm
Density (DEN): T.C. 4	Scale_	64 Kcps/in	Logging speed	20 fpm
Remarks:				

1.1 1 100 11 4 10 - 1	HO		LOTHIBL	CAL LOGS	,	DEP	TH
LITHOLOGY	STRIP	G	SP	RES	DEN	FT	M
0- 20 - Soil, olive-gray and yellowis brown; gravel (5'-10')	h- , , , , , , , , , , , , , , , , , , ,					0-	- (
20- 65 - Mudstone, gray; minor, light- gray, medium-grained sandston with white mica				Florid		- - 50-	-10
65- 77 - COAL; carbonaceous shale							-20
77-100 - Mudstone, gray					3		
00-111 - COAL; carbonaceous shale		, #		100		100-	-30
11-191 - Mudstone, gray; light-gray si stone at 130'; traces of carbonaceous shale and coal	1t					-	_40
94				150		150-	-5(
91-204 - Carbonaceous shale and coal							
04-265 - Mudstone, gray, dark-gray, an olive-black; interbedded carbonaceous shale; fine-	ıd			200		200-	-6(
grained sandstone at 230'; co	a1					-	-70
65-280 - Sandstone, light-gray, coarse grained						250-	-80

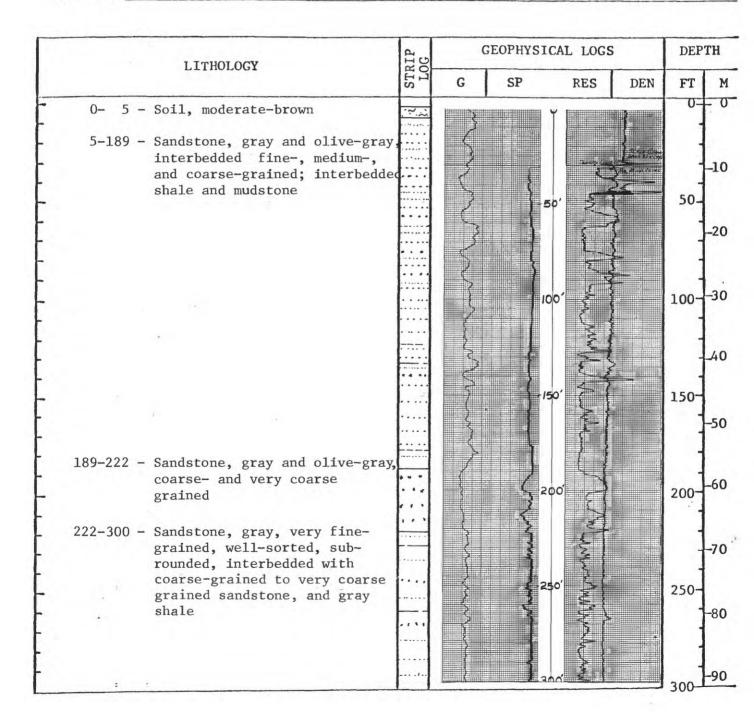
Hole No. C44 Map Coalmont		Date logged 6/20	/77 Elevation	(ft) ^{8,270}
Location: T. 7 N., R. 80 W.	, sec. 19	: 850' FS L 0'		
Drilled depth 300' Logged d	epth 300'	Drilling medium	water Fluid lev	ve1_93'
Geophysical logs:				
Spontaneous potential (SP):	Scale	50 mv/in	_ Logging speed_	20 fpm
Resistivity (RES):	Scale	200 ohms/in	_ Logging speed_	20 fpm
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed	20 fpm
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed	20 fpm
Remarks:				

LITHOLOGY		STRIP	GEOPHYSICAL LOGS			DEPTH		
			G SP RES DEN		DEN	FT	M	
15- 29 -	Soil, moderate-brown, 0'-3' clay, gray, and fine sand Mudstone, light-olive-gray, and coarse-grained sandstone COAL; carbonaceous shale					//VV	0-	-10
34- 42 -	Carbonaceous shale						50-	
42-140 -	Sandstone, light-gray, fine- to medium-grained, with white mica							-20
				*		10 (A)	100-	-3(
140-153 -	COAL, carbonaceous shale, and gray, shaly mudstone		\$				150-	_40
153-300 -	Sandstone, light-gray, fine- grained to very coarse grained, with white mica						-	-50
				57			200	-60
								-7(
							250-	-80
4							300	-9(

Hole No. C45 Map Coalmont	Date logged 6/22	/77 Elevation	(ft) 8,240						
Location: T. 6 N., R. 81 W.	, sec. 1	• 1475 FNL 1775 FWL Cored: Yes X No							
Drilled depth 300' Logged d									
Geophysical logs:			water						
Spontaneous potential (SP):	Scale	50 mv/in	_ Logging speed_	20 fpm					
Resistivity (RES):	Scale	200 ohms/in	Logging speed_	20 fpm					
Gamma (G): T.C. 2	Scale	200 cps/in	Logging speed_	20 fpm					
Density (DEN): T.C. 2	Scale	64 Kcps/in	Logging speed_	20 fpm					
Remarks:									



Hole No. M47 Map MacFarlane Reservoir Date logged 7/12/77 Elevation (ft) 8,190' Location: T. 7 N., R. 80 W., sec. 22 : 600' FN L1,050' FE L Cored: Yes X No Drilled depth 800' Logged depth 800' Drilling medium water Fluid level 31' Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm Scale 400 ohms/in Logging speed 20 fpm Resistivity (RES): Scale 200 cps/in T.C. 2 Gamma (G): 20 fpm Logging speed Density (DEN): T.C. 2 Scale 64 Kcps/in 20 fpm Logging speed Remarks:



Hole No. M47 (continued)

		LITHOLOGY	STRIP LOG	GE	OPHYSICA	L LOGS		DE	PTH
			STI	G	SP	RES	DEN	FT	М
	300-317 -	As above	10111		J				
		10.000 11.000 10.000		5		3 5		1	
	317-398 -	Sandstone, light-gray to gray,		1		<u> </u>		•	10
		very fine-grained		}		F		-	- 10
				Å		31		-	
				.	رياره الما	-LJ-		350-	
				Z .	3 350	51			_ 11
				Ì	4	\$ 1			
				i Ç	*	31			
					ŧ				
	398-435 -	Sandstone, gray, fine- to						1	- 12
		coarse-grained, well-sorted,	******		400	7		400-	
		subrounded; interbedded gray		3		<i>§ (</i>		-	
		shale, and carbonaceous shale	1	}	f	<i>5</i> }		-	
				3		3 7			_ 13
1	435-478 -	Sandstone, light-gray to gray,		2					
		coarse- and very fine grained;	1	λ		45.			1
		minor carbonaceous shale and			J-450'			450-	
		gray shale			1 8	_ D=		-	- 14
	/70 (00	0 - 1-1			3 4			-	
J.	4/8-609 -	Sandstone, gray, interbedded		3		e f	 		
		fine- and coarse-grained, and		E	1 .	$+$ ϵ ϵ			- 1
		gray shale							- 1:
					500'	4		500-	
					- - - - - - - - 	. 			
						<i>(</i> }		1	- 16
			1	7		- 3		- 1	
				i,	4	F .		-	
			23.2.1	4	650	-5-4		550-	
	4.	A contract of the contract of		\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	4	<i>(</i> 2)			- 17
				}		l l			
				Ż	1	Žį.		100	
						5 []		1	
			11					-	- 18
	609_700 _	Sandstone, gray, fine- to		Ì	7-600'	₹ ,		600-	
	009-700	very coarse grained; shale		4	7	Ş			
		less abundant than above			ב ו	25			- 19
		Test abandane than above				5			_ 1;
					.				
				Ι ς .		L		100	
	4	y i		Į	-650	 		650-	- 20
				l Ł		\$(-	
						< }		-	
				\				-	
			:::	5		[_ [i i		- 21
						7 8			

Hole No. M47 (continued)

LITHOLOGY	RIP	GEOI	PHYSICAL	LOGS		DE	PTH
HIMOLOGI	STRIP	G	SP	RES	DEN	FT	М
700-745 - As above							- 22
745-800 - Sandstone, gray, very fine- and very coarse-grained, sub- angular to subrounded	:::::: :::::::::::::::::::::::::::::::		750'			750 -	- 23
			3			800-	- 24
.1 1	1		-			300	- 25
		ž(I)	19			850 <u>-</u>	- 26
						-	- 27
	1		•			900	

Hole No. M62 Map MacFarlane Reservoir Date logged 10-30-77 Elevation (ft)8,270' : 675 FNL2450 FEL Cored: Yes X No Location: T. 6 N., R. 80 W., sec. 3 Drilled depth 640 Logged depth 640 Drilling medium air-mud Fluid level 35 Geophysical logs: Spontaneous potential (SP): Scale 100 mv/in 20 Logging speed fpm 500 ohms/in Resistivity (RES): Scale Logging speed 20 fpm 25 cps/in T.C. 4 Gamma (G): 20 fpm Scale Logging speed Density (DEN): T.C. 4 1.6 cps/in 20 fpm Scale Logging speed Remarks:

	LITHOLOGY	d I D	(GEOPHYSIC	AL LOGS	3	DEP	TH
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	M
0-95	Sandstone, white to very light gray, weathered light-grayish- orange to 20'; fine- to medium-grained, subangular, poorly consolidated, with white mica and minor biotite			-50	tivo Livs		50-	- 0 -10
95-152	Sandstone, as above; silty shale, brownish-black							-20
3				-100			100-	-30
7.4				55			150-	_4C
152 -1 86 186-208	Shale . Sandstone (see 0'-95')		}				130	-50
				-200			200-	-60
208-245	Shale							-70
, 4 · ·	; A			-250			250-	-80
245-300	Sandstone (see 0'-95'); inter- bedded shale			700			300	-90

Hole No. M62 (continued)

	LITHOLOGY	STRIP LOG	GEO	PHYSICAL	L LOGS		DE	PTH
		STE	G	SP	RES	DEN	FT	М
300-325	Sandstone and shale							
					}	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
			 }		7		-	- 10
325-349	Siltstone, light-gray						-	
				-350'-		}	350-	
349-373	Shale		3			\$		- 11
			1			7		
			3				400-	- 12
- 14	5- 1 B			400-			400	
373-465	Sandstone, white, fine-grained,			at thes				
373 103	well consolidated, with white		131					_ 13
	mica; siltstone, light-		(客				-	
24	brownish-gray			-450'-			450-	
465-509	Siltstone, light-grownish-gray		\$	1		\$	-	- 14
			3			[]	1	
			ŢŢ.					
			<i>\(\{\{\}\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</i>				500	- 15
509-541	Shale, brownish-black		}	-300-			3007	
		-	3				-	- 16
-/1/	21.		§			3	4	_ 10
541-554	Siltstone		\				-	
4			[-550-		3	550-	- 17
554-591	Sandstone (see 373'-465')		1			}	1	
			3]	
			3			3	1	- 18
591-6/0	Shale, brownish-black; siltstone,		3	60a		3	600	
771 040 1	light-brownish-gray		}		ļ.			
			{				-	- 19
	- A		}				+	
							1	
	4	1 1	3 = 7 = 2				650-	- 20
]	
						1	1	
							4	- 210
							700	

Hole No. M66 Map MacFarlane Reservoir Date logged 10-18-77 Elevation (ft) 8,310 Location: T. 6 N., R. 80 W., sec. 9: 3650 FNL 100 FEL Cored: Yes X No Drilled depth 800 Logged depth 800 Drilling medium mud Fluid level 16 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed Resistivity (RES): 20 Scale 500 ohms/in Logging speed fpm 20 Gamma (G): T.C. 4 Scale 200 cps/in Logging speed fpm 20 fpm Density (DEN): T.C. 4 Scale 3.2 Kcps/in Logging speed Remarks: Water (5 GPM) between 120' and 660'.

,	LITHOLOGY	G	G	EOPHYSI	CAL LOGS	3	DEP	TH
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	N
0-5	Soil, sandy, moderate-yellowish- brown, medium-grained; gravel	272				L Juda Lever W	0-	
5-72	Sandstone, pale-yellowish-orange and brown, fine- to medium- grained, poorly consolidated;		1		50'-	844. jiroo	50-	-1
72-95	gravel within upper 20'		***		}			-2
72-93	Sandstone, pale-yellowish-gray, coarse- to fine-grained, poorly consolidated, with muscovite		1					
95-118	Siltstone, light-greenish-gray				00' }		100-	-3
			Ì					4
			ŧ	-/:	50-5		150-	
	,				} }			-5
				3	\ \{\}		1	
				2(00'- }		200	-6
118-300	Sandstone, very light gray, very fine grained, poorly consolidated		3				4	-7
	ā 4		Î	-2!	504		250-	
					3			-8
				\ \{\bar{\}}	Ž			
	f = 1			3 3	m' E		300	-9

Hole No. M66 (continued)

	LITHOLOGY	STRIP LOG	GEO	PHYSICA	L LOGS		DE	PTH
	,	STE	G	SP	RES	DEN	FT	M
300-306 306-316	Sandstone, as above Siltstone, greenish-gray to white			3	§]			- 10
							350-	
				350-			330-	- 11
316-418	Sandstone, white to light-gray, fine-grained, well-consolidated				}	4		- 12
418-421	Mudstone, brownish-gray			400'-			400-	
								- 13
421-479	Sandstone, white, coarse- to medium-grained, subangular, poorly consolidated			-450'-			450 <i>-</i>	- 14
479-491	Sandstone, light-gray, fine- grained							- 1.
				500'-			500-	
491-570	Sandstone, very light gray to white, coarse- to medium-grained, subangular, poorly consolidated		TANK THE	550			550-	- 1
570-634	Sandstone, very light gray to white, medium- to fine-grained, subangular, poorly consolidated				1		,	- 17
201100				<u>}</u> _600'	3 1		600-	- 1
634–690	Mudstone, silty, light-gray and white siltstone						1	- 1
690-700	Sandstone, white to light-gray, medium- to fine-grained, with muscovite				{		-	
.1	indscovice			650	\{\bar{\} \\ \}		650 – - -	- 2
				200	} (700	- 2:

Hole No. M66 (continued)

LITHOLOGY	G	GEOI	PHYSICAL	L LOGS		DE	PTH
LITHOLOGI	STRIP	G	SP	RES	DEN	FT	М
700-747 Sandstone, as above							- 220
747-778 Mudstone, light-gray			750	,		750-	- 230
778-796 Sandstone, white, medium- to coarse-grained			3				
796-800 Mudstone, light-gray	===		* 1 Rh			800-	- 240
							- 250
		√nii	-			850 -	- 260
							- 270
		-			-	900-	

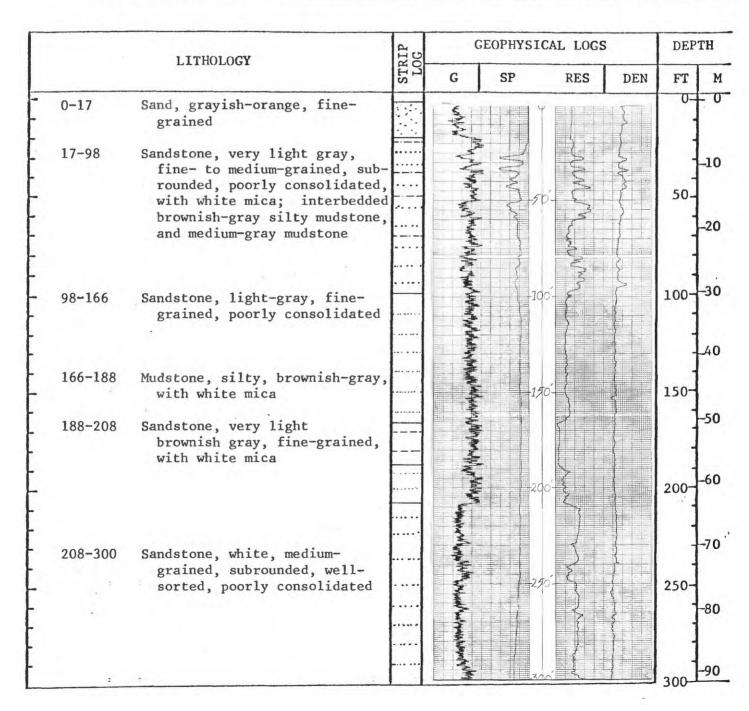
Hole No. B70 Map Buffalo Pe	ak	Date logged_	10-21-77 Elev	ation (ft)	8380
Location: T. 6 N., R. 80 W.	, sec	14 : 1850 F S L	2550 FW L Cored	: Yes	No No
Drilled depth 593 Logged d	epth 59	1 Drilling med	fum air-mud Flu	id level	90
Geophysical logs:					
Spontaneous potential (SP):	Scale_	100 mv/in	Logging s	peed 20	_fpm
Resistivity (RES):	Scale_	2000 ohms/in	Logging s	peed 20	_fpm
Gamma (G): T.C. 4	Scale_	25 cps/in	Logging s	peed 20	_fpm
Density (DEN): T.C. 4	Scale_	6.4 Kcps/in	Logging s	peed 20	_fpm
Remarks: Water (10 GPM) betw	reen 185	and 600'.			

	LITHOLOGY	GG	(GEOPHYS	ICAL LOGS	5	DEP	TH
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	1
0-18	Mudstone, silty, light-olive-gray		1		Y		0-	- (
18-41	Sandstone, light-olive-gray, fine- grained		Ž.					-10
41-49	Sandstone, light-brown, fine- to medium-grained	• • •	\{\bar{\}}		50'-		- 50-	
49-75	Sandstone, dark-yellowish-orange, very coarse grained no medium- grained, subangular, poorly							-20
75-104	consolidated Sandstone, medium-gray, very fine grained to fine-grained, poorly consolidated		\{\bar{\}}	-/(002		100-	-31
164-139	Sandstone, light-gray, medium- to fine-grained, poorly consolidated						150-	_4(
139-179	Sandstone, medium-light-gray, fine-grained, poorly consolidated				-		130	-51
	Sandstone, white, coarse-grained to very coarse grained, poorly consolidated			-2	00'-		200-	-61
197-208	Mudstone, silty, medium-gray						-	-
208-300	Sandstone, white, coarse- grained to very coarse		\$	-2.	50'-		250-	-7
	grained, poorly consolidated						230-	-80
		. ,	15				-	_

Hole No. B70 (continued)

	LITHOLOGY		STRIP	GEO	PHYSICA	L LOGS		DE	PTH
	7.2477777		STI	G	SP	RES	DEN	FT	М
			1 .	L. M. Market Mar	-350-			350-	- 10 - 11
					-400'-		01350	400-	- 1:
			· ,	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		\$ 			- 1
300-600	Sandstone, as a	bove			-4504-			450-	- 1
				C. P. Andrews	-500'-			500	- 1
									- 1
					-550			550-	- 1
									- 1
			,					600	- 1
			=					650-	- 2
									- 2

Hole No. S72 Map Spicer Pe	ak Date logged 10-1	3-77 Elevation (ft) 8,250
Location: T. 6 N., R. 80 W.	, sec. 18 : 400 FS L 1500	FE L Cored: Yes X No
Drilled depth 800 Logged d	epth 800 Drilling medium	mud Fluid level 0
Geophysical logs:		
Spontaneous potential (SP):	Scale 50 mv/in	Logging speed 20 fpm
Resistivity (RES):	Scale 500 ohms/in	Logging speed 20 fpm
Gamma (G): T.C. 4	Scale 100 cps/in	Logging speed 20 fpm
Density (DEN): T.C. 4	Scale 3.2 Kcps/in	Logging speed 20 fpm
Remarks: Water (5 GPM) between	een 180' and 360' and between	420' and 500'.



Hole No. S72 (continued)

	LITHOLOGY	STRIP LOG	GEO	PHYSICAL	LOGS		DE	PTH
		STI L(G	SP	RES	DEN	FT	М
	5-				11212			
	100		3		15/		_	
300-337	Sandstone, as above				\$ 1			- 10
		H	(Second		} = }_			
			复	350	1 / □		350-	
			1		$\{ \dots \}$		-	- 11
202 000			1				-	1
337-403	Mudstone, silty, brownish-gray		夏	1011	$\langle + \rangle$			- 12
				400-			400-	
			1				-	
					1		Ī	_ 13
			\$				450-	
1	1	1	1	1 1/201			450-	- 14
403-538	Sandstone, white, medium-grained		1 1			i salah		
	subrounded, well-sorted, some is poorly consolidated;		1		7			
	interbedded brownish-gray		3		5			- 15
	silty mudstone		=======================================	1 4	3 8		500-	1.
			\$	7	1 1		-	
					1) (2	- 10
					1			- 11
			E	1	\$ }			
1			3	1 19			550-	١,.
	*		*					- 17
			3				1	
538-700	Mudstone, brownish-gray; inter- bedded white, medium-grained,		1				-	10
	subrounded, well-sorted,		\$	11,,	I I			- 18
	poorly consolidated sandstone	1	1				600-	
			3		}			
			3		(++)-			- 19
			Ě		1 1			
			13	1 65c			650-	
I.			I	扫量门量			-	- 20
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				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	}		-	
					4 1-		-	- 21
				1 4 7 /	7-13		700-	

Hole No. S72 (continued)

LITHOLOGY	TIP	GEO	PHYSICA	L LOGS		DE	PTH
BIINOLOGI	STRIP	G	SP	RES	DEN	FT	М
1		Armoration and the second					- 22
700-800 Mudstone and sandstone as above	e,		75	0-1-1		750 - -	- 23
						800-	- 24
							- 25
G		nı)				850 <u>-</u>	- 261
							- 27

Hole No. S73 Map Spicer Peak Date logged 10-14-77 Elevation (ft) 8400 Location: T. 6 N., R. 80 W., sec. 20 : 2400 F SL 2200 F E L Cored: Yes X No Drilled depth 800 Logged depth 800 Drilling medium Fluid level Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 Logging speed fpm 500 ohms/in 20 Resistivity (RES): Scale Logging speed fpm 200 cps/in T.C. 4 Gamma (G): 20 Scale fpm Logging speed Density (DEN): T.C. 4 3.2 cps/in Scale 20 fpm Logging speed Remarks:

	LITHOLOGY	G		GEOPHYSIC	CAL LOGS		DEP	TH
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	М
0-98	Sandstone, pale-yellowish-						0-	-10
	<pre>gray, fine-grained, sub- rounded, poorly consolidated, with white mica; interbedded</pre>			- 5	0	Fruit Goot	- 50-	-10
	light-gray silty mudstone				3			-20
98-108	Mudstone, silty, light-gray			10	nó P		100-	-3C
108-153	Sandstone, very light gray, very coarse grained to		Ž	3	3			_4(
	medium-grained, subangular, poorly consolidated, with white mica; interbedded, white, medium-grained, well-consolidated sandstone			15	O Mind		150-	-5(
153-176	with white mica Mudstone, silty, light-gray			20	00 3		200	-60
							-	-70
176-300	Sandstone, white, fine- grained to very coarse grained, subangular to sub- rounded, poorly consolidated,			25	6-5		250-	-80
	with muscovite		\$	30			300	-9(

Hole No. S73 (continued)

LITHOLOGY	STRIP	GEOPHYSICAL LOGS				DEPTH	
	ST	G	SP	RES	DEN	FT	М
			7	\\ \\ \			
			3				
	****		15				- 10
	• • •	\$					
				Z		350-	
		1	350-	5			- 11
			4)			- 11
			<u> </u>	S.			
			13	S.			
		15					- 12
			400-	3		400-	
			3	\$ III		1.0	7
*	3.33		\$			-	_ 13
			\$		7-	-	- 13
		* ,)			4-1	-	
		37	450-		制制	450~	
		7			# 1	-	- 14
					1		
			3	\$ 5	-}		
					-		- 15
300-700 Sandstone, as above			15 500		4 1	E00-	- 13
Same And Comment of the Assessment of the Comment o			+3	\$		500-	
			- 3		1		
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		3					
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Hole No. S73 (continued)

LITHOLOGY		GIP	GEOPHYSICAL LOGS					PTH
LITHOLOGI		STRIP	G	SP	RES	DEN	FT	М
	ı			700				- 220
700-800 Sandstone, as above				-750			750-	- 230
, as above ,							800-	- 240
								- 250
b ec-	i		nu				850 -	- 260
								- 270

Hole No. B74 Map Buffalo Peak Date logged 10-19-77 Elevation (ft) 8,477 Location: T. 6 N., R. 80 W., sec. 22: 2700 FS L 625 FWL Cored: Yes k No Drilled depth 800 Logged depth 800 Drilling medium air-mud Fluid level 23 Geophysical logs: Spontaneous potential (SP): Scale 250 mv/in 20 Logging speed fpm Resistivity (RES): Scale 2000 ohms/in 20 Logging speed fpm Gamma (G): T.C. 4 25 cps/in 20 fpm Scale Logging speed Density (DEN): T.C. 4 1.6 cps/in 20 fpm Scale Logging speed Remarks:

	LITHOLOGY	G	(GEOPHYSI	CAL LOGS	3	DEP	ТН
	ETTHOLOGI	STRIP	G	SP	RES	DEN	FT	N
0-22	Gravel, and light-brown clay soil		Ž		Ψ-1	1117/2002	0	- (
22-61	Sandstone, white to yellowish- gray, very coarse grained to coarse-grained, subangular to angular, poorly consolidated				clina term		- 50-	-10
	angular, poorly consolidated		}					-20
		· · · · · · · · · · · · · · · · · · ·			oc'- { }	*	100-	-30
61±206	Sandstone, white to light-gray, very coarse grained to coarse-grained, subangular to angular, poorly consolidated; interbedded light-gray silty						150	40
206-225	mudstone Sandstone, light-gray, very				30- Z		150-	-5(
225-250	fine grained Sandstone, white, coarse- to medium-grained, subangular, poorly consolidated			2	oc- 2		200	-60
250-260 260-282	Sandstone, medium-gray, fine- grained Sandstone, white, coarse- to					3	-	-70
200-202	medium-grained, subangular, poorly consolidated		\$		50'- 3		250-	ľ
282-300	Sandstone, medium-gray, fine- grained; interbedded white, coarse- to medium-grained, subangular, poorly consoli-		ar and a second				230-	-80
	dated sandstone		1				300	-90

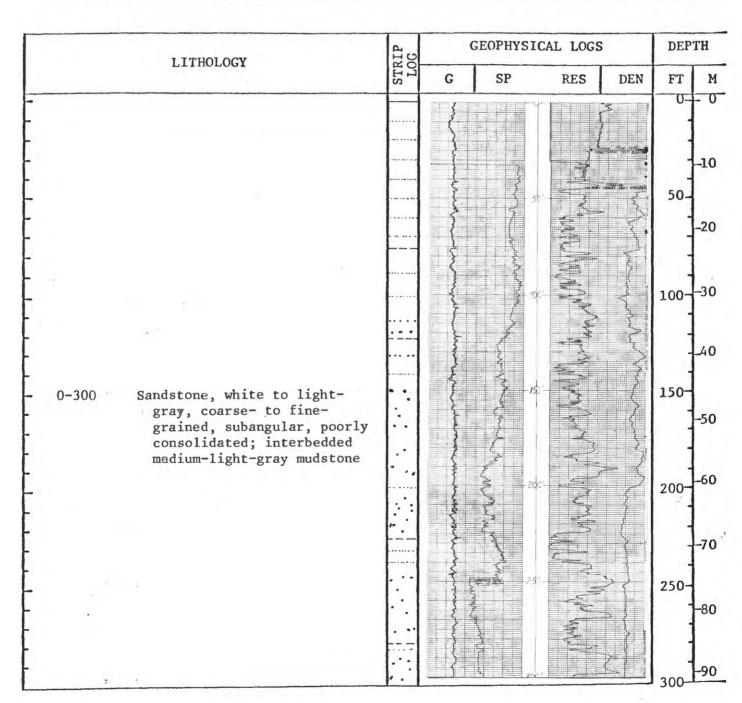
Hole No. B74 (continued)

	LITHOLOGY	STRIP	GEOPHYSICAL LOGS					PTH
1		STI	G	SP	RES	DEN	FT	M
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300-667	Sandstone, as above				\$	\$ 1	-	١.
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					\$	3		
		1,1	\$		7	}		-1
667-682	Sandstone, white, coarse-	100	₹	-600-	Į,	5	600	
	grained, subangular, poorly		Ş	1				
	consolidated			· Ž	\$ '			-1
		"."	§ I	1	3 .		4	-
682-700	Mudstone, silty, and inter-	1.	3	§	3-1		-	
	bedded light-gray mudstone	1 101-	§	650'-			650-	- 2
			\$	1	3		-	- 2
		: : :	?	1		CONTRACT.	1	-
				1	5			-
			[]		5		1	- 2
		ا===ا	Citation	700'			700	

Hole No. B-74 (continued)

	LITHOLOGY	STRIP LOG	GEOI	PHYSICA	L LOGS	- 1	DE	PTH
	HIMOHOOI	STE	G	SP	RES	DEN	FT	М
700-753	Mudstone, silty, dark-yellowish- orange and light-brown; interbedded light-gray mudstone		الماقة المستحديد المدينة بمداد المستحديد المدينة بمداد المستحد المدينة المستحدد المدينة المدين				750	- 22
753-800	Sandstone, light-gray, medium- grained, subangular, poorly consolidated; interbedded medium-gray mudstone		المساهدية والمساودة	750			750 –	- 23 - 24
.,		1		80	· ·	\$	800-	
								- 25
	¥F a		(23)	10			850 -	- 260
								- 27
							900	

Hole No. B75 Map Buffalo Peak Date logged 10-20-77 Elevation (ft) 8600 Location: T. 6 N., R. 80 W., sec. 22 : 1100 FSL 700 FEL Cored: Yes No Drilled depth 784 Logged depth 782 Drilling medium air-mud Fluid level 31 Geophysical logs: Spontaneous potential (SP): Scale 250 mv/in 20 fpm Logging speed Scale 2000 ohms/in Resistivity (RES): Logging speed fpm T.C. 4 25 cps/in Gamma (G): Scale fpm Logging speed Density (DEN): T.C. 4 1.6 cps/in Scale 20 fpm Logging speed Remarks:



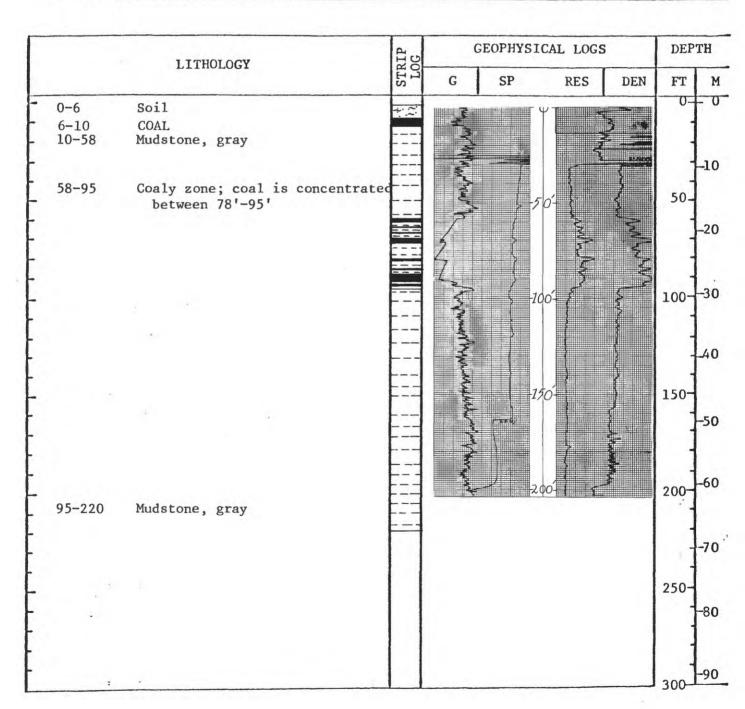
Hole No. B75 (continued)

	LIT	HOLOGY	SIP	LOG	GEOPHYSICAL LOGS				DEPT	
	•		ST	F	G	SP	RES	DEN	FT	M
. ,										- 10
			a .			- 350-			350-	- 13
*	**		* 1			400'			400-	- 12
	0.5									_ 13
300-700		one and inte				450			450-	- 14
			100			-500-			500-	- 1.
						560′			550-	- 1: - 1:
		·				A CONTROL OF CONTROL O				- 18
4	a [#]					-600'-			600- : -	- 19
						-650-			650-	- 21
,									-	- 2

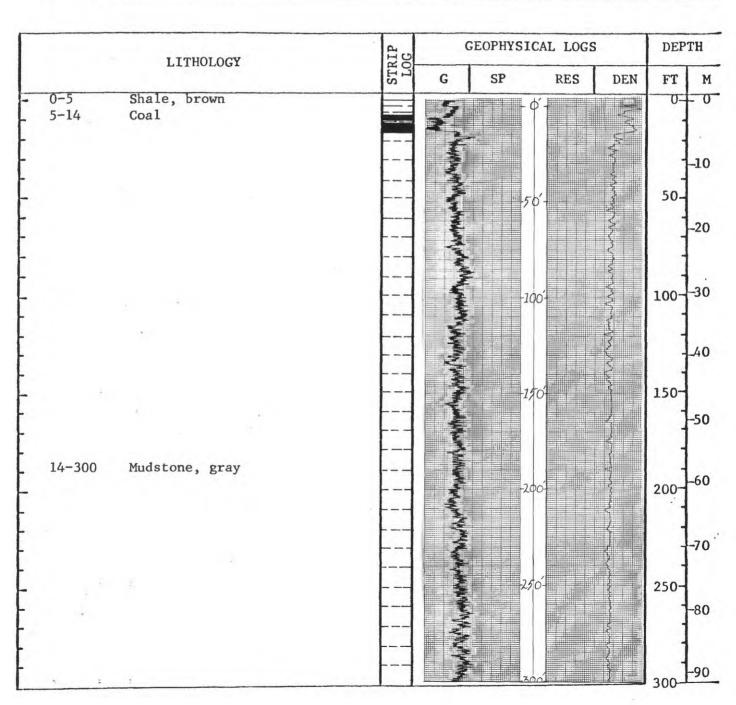
Hole No. B-75 (continued)

724	LITHOLOGY s Sandstone and interbedded	STRIP	G	SP		1		PTH	
				1	RES	DEN	FT	М	
	mudstone, as above			Y L				- 220	
1 %	3a :	1 3		750'-			750-	- 230	
-752 · 14	Sandstone, pale-yellowish-g very coarse to medium-gra angular to subangular, poorly consolidated			-782' -	-		800-	- 240	
-782	Sandstone, light-gray, fine to coarse-grained	-	¥		,			- 250	
1 1	24 (Fe)	- 3	- Mala e	-			850 -	- 260	
								- 270	
X	3	7 24 101	78 24 24 1	78 24- 24 (Sany):1 0	78 24- (r) (r) (r) (r) (r) (r) (r) (r) (r) (r)	78 24 to 1		900	

Hole No. T82 Map Teal Lake Date logged 9-29-77 Elevation (ft) 8640 Location: T. 6 N., R. 81 W., sec. 5 : 300 FS L 625 FWL Cored: Yes K No Drilled depth 220 Logged depth 203 Drilling medium air Fluid level 30 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm 500 ohms/in 20 Resistivity (RES): Scale Logging speed fpm 200 cps/in T.C. 4 Gamma (G): Scale 20 fpm Logging speed Density (DEN): T.C. 4 3.2 Kcps/in 20 fpm Scale Logging speed Remarks:



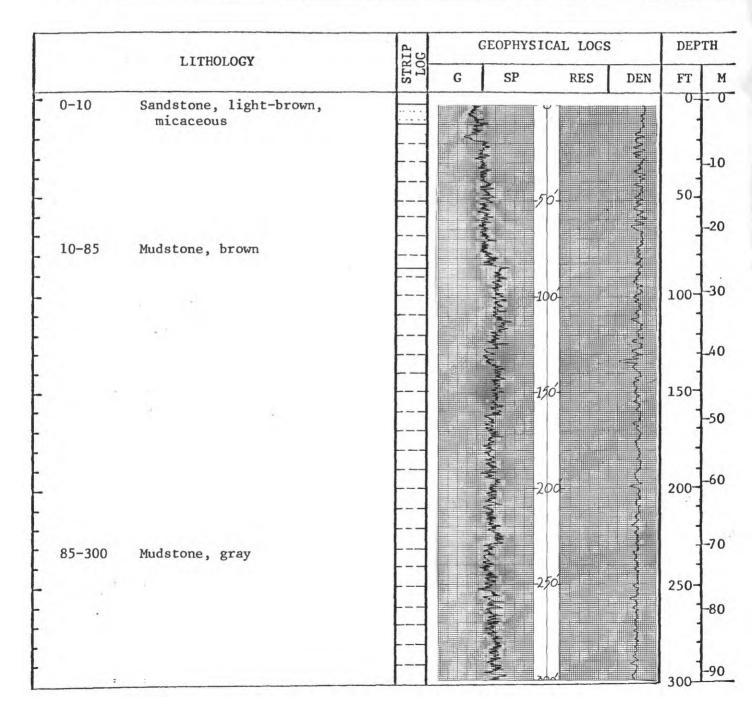
Hole No. T83 Map Teal Lake Date logged 9-29-77 Elevation (ft)8480 Location: T. 6 N., R. 81 W., sec. 8: 1725 FNL 2700 FE L Cored: Yes No Drilled depth 400 Logged depth 400 Drilling medium air Fluid level 353 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed Scale 500 ohms/in 20 fpm Resistivity (RES): Logging speed T.C. 4 Scale 200 cps/in Gamma (G): 20 fpm Logging speed 3.2 Kcps/in Density (DEN): T.C.4 Scale 20 fpm Logging speed Remarks:



Hole No. T83 (continued)

LITHOLOGY	STRIP LOG	GEC	PHYSICA	L LOGS		DE	PTH
,	STE	G	SP	RES	DEN	FT	М
300-400 Mudstone, gray			350-	a health h		350-	- 100 - 110
·		THAT .	400			400-	- 120
						-	_ 130
						450-	- 140
						500-	- 150
						-	_ 160
						550 -	– 170
						600	– 180 – 190
						650-	– 200
						700	- 210

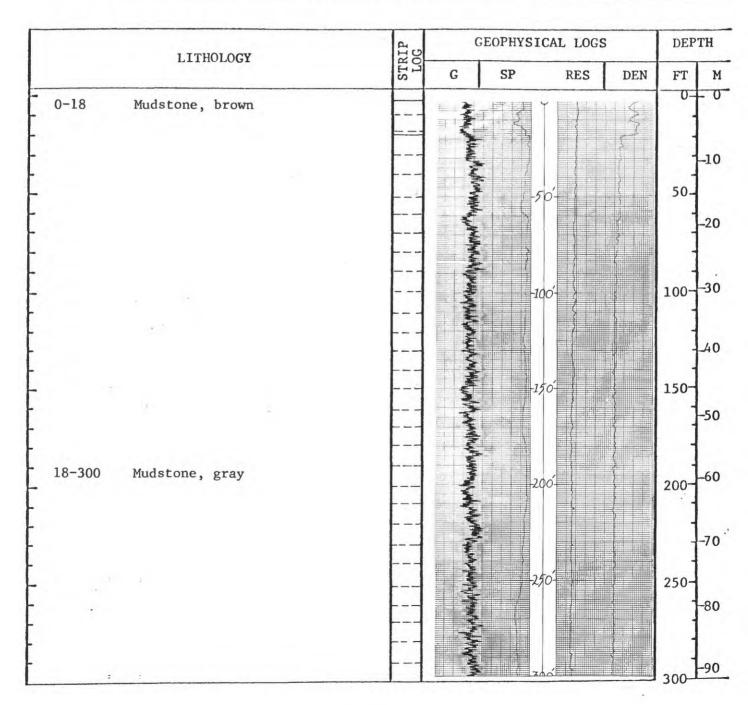
Hole No. C84 Map Coalmont Date logged 9-30-77 Elevation (ft) 8,563 Location: T. 6 N., R. 81 W., sec. 9 : 1900 FN L 3800 FEL Cored: Yes X No Drilled depth 400 Logged depth 400 Drilling medium air Fluid level 373 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm 500 ohms/in 20 fpm Resistivity (RES): Scale Logging speed Scale 200 cps/in T.C. 4 20 fpm Gamma (G): Logging speed Scale 16 Kcps/in Density (DEN): T.C. 4 20 fpm Logging speed Remarks:



Hole No. C84 (continued)

4		LITHO	OCV		G II	GEOPHYSICAL LOGS				DEPTH	
		ĻIIIO	LOGI		STRIP LOG	G	SP	RES	DEN	FT	М
	i j						/ψυ				- 10
. 300	-400	Mudstone,	gray								
	1 2	*					340			350- - -	- 11
						7	μρά			400-	- 12
	ş				*		,				_ 13
	19	3			,			9	1	450-	- 14
							650				
	,		3		# 1535.F. #					500-	- 1
											- 10
	- 3	4			1000		**		4	550-	- 17
				. 7							- 18
	1				e trace a					600-	1,
											- 1
					i u ma		140		-	650-	- 2
	*										- 2

Coalmont Date logged 9-29-77 Elevation (ft) 8340 Hole No. C85 Map Location: T. 6 N., R. 81 W., sec. 9 : 3275 FN L 4800 F EL Cored: Yes X No Drilled depth 500 Logged depth 500 Drilling medium air Fluid level 0 Geophysical logs: Spontaneous potential (SP): Scale 50 mtm/in Logging speed 20 fpm Scale 500 ohms/in Logging speed Resistivity (RES): 20 fpm T.C. 4 Gamma (G): Scale 200 cps/in Logging speed 20 fpm Density (DEN): T.C. 4 Scale 3.2 Kcps/in 20 fpm Logging speed Remarks: Water flowing (3 GPM) from the interval between 495' and 500'.



Hole No. C85 (continued)

	LITHOLOGY	STRIP	GEO	GEOPHYSICAL LOGS				РТН
		STE	G	SP	RES	DEN	FT	М
(i.g.				740				- 100
1 1	r		A STATE OF THE STA	350-			350-	- 110
			Washington .	-400-			400-	- 120
300-481	Mudstone, gray	, [-	_ 130
H.g.	a l	,		-4570'-			450-	- 140
481-500	Sandstone, gray, medium- grained	1 - 100 1		500			500-	- 150 - 160
						-	550-	- 170
		-						_ 180
İ		, 1 m. 1					600	- 190 '
		1 000 7	I	ů.			650	- 200
							700	- 210

Hole No. C96 Map Coalmon	t	Date logged 9-18	8-77 Elevation	(ft) 8,160
Location: T. 7 N., R. 80 W.	, sec. 18	: 2650 Fs L 2225	FWL Cored:	les x No
Drilled depth 380 Logged d	lepth 380	Drilling medium_	air Fluid lev	rel 10
Geophysical logs:				
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed_	20 fpm
Resistivity (RES):	Scale	500 ohms/in	Logging speed	20 fpm
Gamma (G): T.C. 4	Scale	200 cps/in	Logging speed	20 fpm
Density (DEN): T.C. 4	Scale	8 cps/in	Logging speed_	20 fpm
Remarks:				

	LITHOLOGY		G	EOPHYSI	DEPTH			
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	М
0-5 5-26	Sand, light-brown; gravel Gravel; some sand, as above						0-	- 0
26-28	Mudstone, medium-dark-gray		1					
28-33	Shale, coaly		1		1			
33-42	Mudstone, brownish-gray and light-gray		5				-	-10
42-46	Shale, coaly	囯	美		p'- \$	1	50-	
46-51	Mudstone, light-gray		1					
51-86	Mudstone, light-gray; siltstone, very light gray, with biotite at 60'							-20
86-131	Sandstone, very light gray,		£ 36					
	fine- to medium-grained, poorly consolidated, with		3	-10	0		100-	-30
	white mica; siltstone, very		3				1	
	light gray, with biotite;						-	
	mudstone, light-gray						-	40
131-166	Mudstone, light-gray; inter-						150	
	bedded, very light gray		₹.	17	io'		150-	
	siltstone, with biotite		3		L L			-50
							1	
			1		Ž		-	
166-271	Sandstone, very light gray,						- 1	-
	fine- to coarse-grained,		.3	20	00-4	3-1	200	-60
	subangular, poorly con-		```		3	1	- 1	
	solidated, with white mica; siltstone, light-gray;		Ş		₹ I		-	
	light-gray and medium-dark-		1		5	3 1	1	-70
	gray mudstone		Ž	Į	5			
	8,		\$	20	50)		050	
	"						250-	
	7. C. S. M. J. A. 77. A.		3		\$		1	-80
271-300	Coal; partings of black mudstone		F				1	
			7				-	-90

Hole No. C96 (continued)

LITHOLOGY		LITHOLOGY			GEOPHYSICAL LOGS					DEPTH	
				STRIP	G	SP	RES	DEN	FT	M	
300-321	Coal; par	tings o	f black							- 10	
321-356	Mudstone,	light-g	gray			-350-	,		350 <u>-</u>	- 11	
356-380	Mudstone,	medium-	-dark-gray		E	30 1			-		
32	.2			3"					400-	- 12	
										- 13	
	•				T)	5.			450-	- 14	
.4	*				4	11			500-	- 1:	
									-	_ 16	
. 9		-				4:			550- -	- 17	
*	<i>j</i>		÷	g en mar g					600-	- 18	
		1 2							. 1	- 19	
- 1				1 t nr=					650 -	- 20	
]	- 2:	
									700		

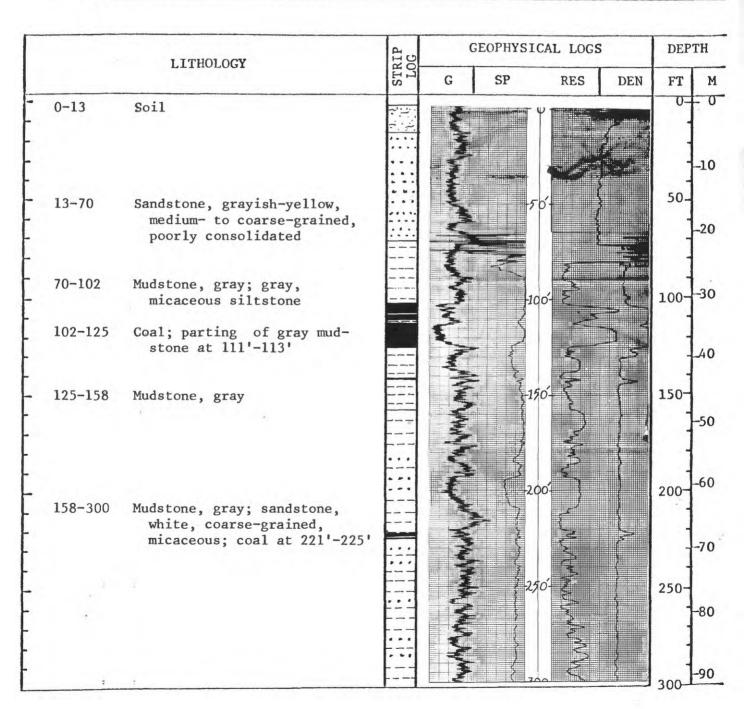
Hole No. C97 Map Coalmont Date logged 9-19-77 Elevation (ft) 8,167 Location: T. 7 N., R. 80 W., sec. 20: 1900 FSL 0 FE L Cored: Yes X No Drilled depth 560 Logged depth 560 Drilling medium air Fluid level 18 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 Logging speed fpm Scale 20 Resistivity (RES): 500 ohms/in Logging speed fpm T.C. 4 20 fpm Gamma (G): 200 cps/in Scale Logging speed Density (DEN): T.C. 4 Scale 3.2 Kcps/in 20 fpm Logging speed Remarks: Water (5 GPM) between 130' and 140'.

	LITHOLOGY		G	EOPHYSI	CAL LOGS		DEPTH	
			G SP RES			DEN	FT	I
0-32	Gravel; sand, pale-yellowish- brown, medium-grained						0_	-
32-68	Sandstone, white, medium- grained to very coarse grained; subangular, with		J				-	-1
	white mica; interbedded medium-dark-gray silty mudstone		Å.	5	56- W		50- - -	-2
68-80	Silty mudstone, medium-dark- gray		3		\\\\\)		
80-89	Sandstone, very light gray, fine- to medium-grained, with biotite		\$	1	00'- NV		100-	-3
89-178	Sandstone, white, medium- grained, to very coarse grained, subangular, poorly	:					-	_4
	consolidated, with white mica; interbedded, medium-gray, brownish-gray, and light-brown mudstone	 		1	50-		150-	-5
178-223	Mudstone, medium-gray and brownish-gray; interbedded silty mudstone, medium-light- gray; sandstone, white, fine-				200		200	-6
	to medium-grained, subrounded, black and white micas; minor carbonaceous shale							-7
223-300	Sandstone, white, medium- to fine-grained, subangular,			-2	50-		250-	
ŧ:	poorly consolidated, with white mica; coal traces			<u>k</u> -				-80
			6 5 6 3-		·		300	-9

Hole No. C97 (continued)

	LITHOLOGY			GEO	PHYSICA	L LOGS		DEPTH	
		STRIP		G	SP	RES	DEN	FT	М
 1.		2		<i>I</i> 4, 1					
						\		-	
300-377	Sandstone, as above					į		-	- 10
	4			Į				-	
		4	HHI	4	350-	7		350-	
377-388	Coal			§ :		Ì		-	- 11
			1	}	<i>y</i>	3	<i>{</i>		
388-400	Siltstone, white		- HHHHH		2				
300 400	Sittstone, white					27		100	- 12
400-412	Coal; mudstone, light-gray;	7			-400-			400-	
	very light-gray siltstone				9	ζ*			
412-467	Silty mudstone, light-gray			3		}			_ 130
	to very light gray; inter-	-		T di		٤			
	bedded, brownish-gray and			通	-450-	<i>₹</i>		450-	
	dight-gray mudstone	·		4.5		\$			- 14
						*		- 4	
				\$			Ì	- 14	
467-522	Sandstone, very light gray, medium- to coarse-grained,			遇		\$			- 150
	subangular, poorly	100		~	\$ -500	,		500-	
	consolidated			12		$= \xi - i$		-	
				14		\mathcal{E}		1	- 16
522 ~5 52	Mudstone, brownish-black			, <u>}</u>		,		1	
				3				550-	
552-560	"Sandstone, very light gray, medium- to coarse-grained,	7.5.4	HIMI	2-5	560	`*		330	- 170
	subangular, poorly								
	consolidated						- 1	-	
								+	- 180
7*	2	9 4200 4						600	
									- 190
								1	- 1
ų.		2 1.117	-	- X	-6			650-	- 200
]	
								1	
								- 1	- 210
	4							700	

Hole No. C98 Map Coalmont Date logged 9-26-77 Elevation (ft)8,218 Location: T. 7 N., R. 80 W., sec. 21 : 1200 FN L 3500 FW L Cored: Yes X No Drilled depth 700 Logged depth 700 Drilling medium mud Fluid level 80 Geophysical logs: Spontaneous potential (SP): Scale 25 mv/in 20 fpm Logging speed Scale 500ohms/in Resistivity (RES): 20 fpm Logging speed T.C. 4 200 cps/in Gamma (G): 20 fpm Scale Logging speed Density (DEN): T.C. 4 3.2 Kcps/in Scale 20 fpm Logging speed Remarks:



Hole No. C98 (continued)

	LITHOLOGY			LOG	GEOPHYSICAL LOGS				DEPT	
			E	T(G	SP	RES	DEN	FT	М
	Ç#	4	1			700				
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:						\$	Ŝ		200	
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	1.3	g#	1			-450-	₹		450-	1
			E		7		2		1	- 14
			F		2		}		1	
			F						-	
3	00-555	Mudstone and sandstone, as			3	3			4	- 15
		above	+			500	Y.		500-	
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			F				-			
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			t			3			1	
					S	3			-	- 19
_					*		T 1		- 1	
5.	55-700	Sandstone(?), poor cuttings					3		- 4	
		samples				-650-	<i>}</i>	Tent H	650-	
	*		7.17		4 <		<u> </u>		050-7	- 20
			1				B		1	
			1		3 5				1	
			1.		3		ا جر		4	
			1.				~ *		4	- 21
						700			700	

Hole No. C99 Map Coalmont		Date logged 9-20-	77 Elevation	(ft) 8,140
Location: T. 7 N., R. 80 W.,	sec. 21	: 1500 FN L 1600 F	WL Cored: Ye	s X No
Drilled depth 840 Logged dep	th 840	_Drilling medium	mud Fluid leve	1 6
Geophysical logs:				
Spontaneous potential (SP): S	cale 50) mv/in	Logging speed	20 fpm
Resistivity (RES): S	cale 500	ohms/in	Logging speed	20 fpm
Gamma (G): T.C. 4 S	cale100	cps/in	Logging speed	20 fpm
Density (DEN): T.C. 4	cale 3.	2 Kcps/in	Logging speed	20 fpm
Remarks: Water (10 GPM) betwee	n 300' an	d 320' and water (5	GPM) between 600	o' and 680

LITHOLOGY			GEOPHYSICAL LOGS GEOPHYSICAL LOGS GEOPHYSICAL LOGS GEOPHYSICAL LOGS					
		STI	G	SP	RES	DEN	FT	N
0-26	Gravel		\$		17		0-	- (
26-74	Mudstone, brownish-gray and light-gray, some silty; coal at 60'		- X		50'- }		50-	-10
								-20
74-142	Sandstone, white, coarse- grained to very coarse				200'-		100-	-3(
	grained, subangular to angular, poorly consolidated; gravel		Š.		150'-		150-	_4(
142-172	Mudstone, brownish-gray and shaly, some pale-yellowish-brown and silty							-50
172-197	Sandstone, white, coarse- grained to very coarse grained, subangular, poorly consolidated; gravel				200-		200-	-61
197-203	Mudstone, black, shaly							-7(
					250- 3		250-	
	W. 1. 4. 5. 5. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.				\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \		-	-80
203-300	Mudstone, light-greenish-gray, silty		# **				1	_0.4
	÷				300' 3		300	7

Hole No. C99 (continued)

		LITHOLOGY	STRIP LOG	GEO	PHYSICA	L LOGS		DE	PTH
			STI	G	SP	RES	DEN	FT	М
	A 28	2			700				
		4			3 .	7		_	
	200 265	W. Jahana and Kana			**	ζ,		-	- 100
:	300-365	Mudstone, as above		13 4	13				
					3 350	3		350-	
				Ž	3 //	-			- 110
				£	1	7		-	
	365-422	Sandstone, white, fine-grained	,		•	5			
		to very coarse grained,		73					- 120
	24	finer-grained upwards, sub- rounded to subangular, well-			-400			400-	
		sorted, poorly consolidated;		ŧ]		1	
		light-brownish-gray mudstone							_ 130
		at 385'-406'				\$			
	422-486	Mudstone, light-brownish-gray;				5		450-	
	122 100	interbedded, white, fine- to			-430-			4507	- 140
		medium-grained, subrounded,		14		`\	.		
		well-sorted, poorly consoli-				<			
		dated sandstone		<i>F</i> ,7*		Š.			- 150
	486-571	Sandstone, white, medium-			-500-		À	500-	- 150
		grained to very coarse	11	美				1	
		grained, subangular, poorly consolidated		4		.		4	- 160
		Consolitated		12				-	- 100
						 			
	571-620	Mudstone, light-brownish-gray;		- [4]	-550			550-	- 170
	371-020	interbedded, fine-grained		1		\$		1	- 1/0
		sandstone		1		₹		- 1	
								1	- 180
						ξ.			- 100
	620-630	Mudstone, brownish-gray	1313			2	Í	600	
					2	\$		•]	
	630-693	Sandstone, very light gray,				i i		1	- 190
	030 093	medium- to coarse-grained,				Ę		1	
		poorly consolidated			-650-	- (-		650	0.07.5
	*			4	Y	/ر	İ	-	- 200
						Ş		4	
	693-700	Mudstone, brownish-gray, some				3.		4	
		silty		ı Ç		ا کر		4	- 210
			二二二		700			700	

Hole No. C99 (continued)

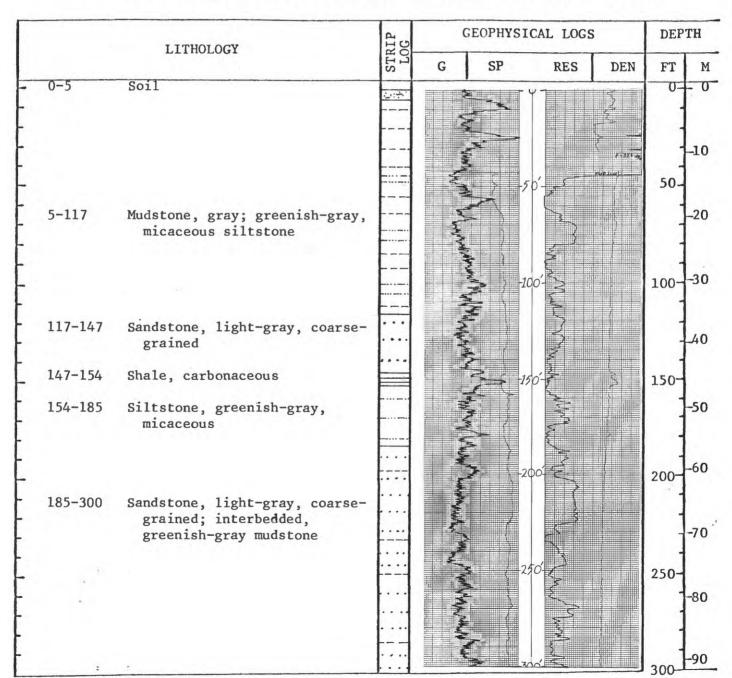
		LITHOLOGY	9		GIP	GEO	PHYSICAL	LOGS	4	DE	PTH
		ZZZMODOGZ			STRIP LOG	G	SP	RES	DEN	FT	М
	_ 32	· t _y		12	1		3 700				
						1					- 22
						36,	> \	Ĭ			7 22
						1	¥	Ì		-	
	7.78	13 1/4/0		:2			3 750	4 🐔		750-	- 230
	700-840	Silty mudstone,	as above				3	Ç			-50
		,		1		Ē	*3	7		1	
				I		1.4	.	Ĺ			- 240
	* 19	n.			35 F	54	\$ 800	<u> </u>		800-	
	- 11	n		21 ~				3		-	
				1		i i	7°-				- 250
				-		3.	7	Ì			
				+		#5 1	840	· (050	
	121	121. 1010		-21	+	44 to 1 = 1	-		2011	850 -	- 260
											- 270
_			*			-				900	

Hole No. M100 Map MacFarlane R	eservoir	Date logged 9-2	1-77 Elevation	(ft)	8,188
Location: T. 7 N., R. 80 W.	, sec. 22	: 650 FS L 1150	FWL Cored:	Yes 5	No
Drilled depth 400 Logged d	epth 400	Drilling medium_	air Fluid le	ve1_4	9
Geophysical logs:					-11
Spontaneous potential (SP):	Scale	50 mv/in	_ Logging speed_	20	_fpm
Resistivity (RES):	Scale	500 ohms/in	_ Logging speed_	20	_fpm
Gamma (G): T.C. 4	Scale_	100 cps/in	_ Logging speed_	20	_fpm
Density (DEN): T.C. 4	Scale	3.2 Kcps/in	Logging speed_	20	_fpm
Remarks: Water (5 GPM) between	en 120' ar	nd 250'.			

		I TELLOL OCY	GIP	G	EOPHYS:	ICAL LOGS	3	DEP	TH
		LITHOLOGY	STRIP	G	SP	RES	DEN	FT	M
-	0-5	Soil, moderate-yellowish-brown	5 200	131		Y		-0-	- 0
	5-41	Sandstone, very light gray,		- S				-	
		very coarse grained; mud-						-	-10
		stone, light-gray						-	-,
	41-50	Mudstone, light-gray			111	50'+	Fluid Level	50-	
	50-72	Coal		- 3					
	72-85	Siltstone, very light gray;		5					-20
		white, fine-grained sandstone			- . _	Ç			
	85-91	Silty mudstone, medium-gray;		1				13	
		coaly shale; coal at 88'-89'			7			-	
	91-110	Sandstone, fine- to medium-		*	1	100		100-	-30
		grained, well-sorted, poorly		*	-	3		-	
		to well-consolidated, with		<u> </u>				-	
	110 101	white mica		₹.					4
	110-121	Mudstone, medium-gray; coal at 112'-113'		Į į					
	121-175	Sandstone, white, medium-			ligii.				
	121 175	grained to very coarse grain-			1	50-		150-	
		ed; subangular, poorly con-		33				-	-50
		solidated, with white mica;		£.,				-	
		light-gray silty mudstone	===		(a) (a)			-	
	175-203	Mudstone, brownish-gray and		1		12727		-	
		black; coal at 182'-183';		E	2	00-		200-	-60
		interbedded, greenish-gray,	::::	2	- L	4			
		fine-grained, well-sorted	11.1.1.1	1		1			
	200 251	well-consolidated sandstone							-70
	203-254	Sandstone, white, coarse-		\\					' '
		grained, subangular, poorly							
	-	consolidated with white mica;		2		20		250-	
		<pre>interbedded sandstone, greenish-gray, fine-grained,</pre>				5		-	-80
	•	well-sorted, well-consolidate	J	1				-	-
	254-289	Sandstone, very light gray,		*					
		fine-grained, well-consoli-							
		dated, with white mica; shaly		13	144			300	-90
-		mudstone, medium-dark-gray;						200-	
		light-gray siltstone							
	200 200								

		LITHOLOGY	100	100	GEC	PHYSICAL	LOGS		DE	PTH
			S S S S S S S S S S S S S S S S S S S	T	G	SP	RES	DEN	FT	М
300-341		ndstone, medium-lighterine-grained, with whomica; sandstone, white medium- to coarse-grassubangular, poorly consolidated, with white brownish-gray mudstone	e, ined, ined, ined, ined, ined, ined; ine			350-			350-	- 100 - 110
341-400		ndstone, white, medium to coarse-grained, sub angular, poorly consolute with white mica	b- ·		3	440			400-	- 120
		*							-	_ 130
1.9	J			-	1	ν.			450-	- 140
įa.	•			17		4			500-	- 150 - 160
,	đ			-	*	- 1	~	-	550-	- 170
Y	.*		. T . A	. 3 . 2	4				600-	- 180 - 190
ų.	2		, i, i, j, i	u -		- 2			650-	- 200
ž									700	- 210

Hole No. M101 Map MacFarlane Reservoir Date logged 10-1-77 Elevation (ft) 8,230 Location: T. 7 N., R. 80 W., sec. 25 : 1350 FN L 1650 FEL Cored: Yes X No Drilled depth 830 Logged depth 830 Drilling medium mud Fluid level 45 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm Scale 1000 ohms/in Logging speed Resistivity (RES): fpm T.C. 4 200 cps/in Gamma (G): Scale fpm Logging speed Density (DEN): T.C. 4 Scale 3.2 Kcps/in 20 fpm Logging speed Remarks: Density log 550'-830' run separately on a different sheet from the SP, RES, G, and DEN 0'-550'. Water (5 GPM) between 120' and 140'.



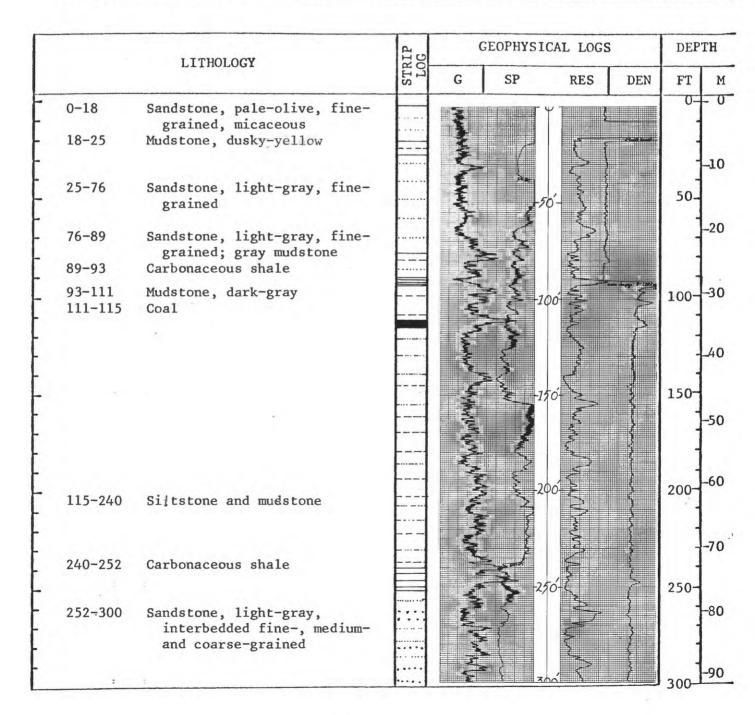
	LITHOL	.OGY			LOG	GEO	PHYSICA	L LOGS		DE	PTH
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300-615	Sandstone,	light-gra ded, green	у;	-	• •					-	_ 130
	mudstone	ded, green	isn-gray	y -						1	
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615-700	Sandstone,	light-gra		1.			\$ 600-			500-	- 100
015 700	siltstone	e; black m	udstone;					\$		1	
	cutting s	samples al	1 poor		.]	1		X.		4	- 190
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LITHOLOGY	GILP	GEO	PHYSICAL	LOGS		DE	PTH
HIIIODOGI .	STRIP	G	SP	RES	DEN	FT	М
12 12	12 3						- 22
700-830 Sandstone, siltstone, and			750-	No.		750 -	- 23(
mudstone, as above; poor samples	: : : : :::::						- 240
*11 - 11	;		800-	() { } ?		800-	0.5
			\$	4			- 250
134 - 134 1					F	850 -	- 260
							- 270
	Jan 1					900-	

	LITHOLOGY	STRIP	GE	OPHYSICA	L LOGS		DE	РТН
		STI	G	SP	RES	DEN	FT	М
						,	350	- 100
							350-	- 110
							400-	- 120
-							- 450-	_ 130 _ 140
- - - _ 550-615	Sandstone, light-gray							- 140 - 150
- 330 023	ballacenc, 115mc 512,						500-	- 160
				770			550-	– 170
615-700	Sandstone, light-gray; siltstone black mudstone; cuttings samples all poor			-606			600	- 180 - 190
				-650-			650	- 200
				700			700-	- 210

	LITHOLOGY	2	S	GEO	PHYSICAL	LOGS		DE	РТН
	LITHOLOGI .	STR	100	G	SP	RES	DEN	FT	M
12.	L ₂	15			, ψ				- 22
700-830	Sandstone, siltstone, and	28			-750-			750-	- 23
·n-	mudstone, as above; poor samples	,	- 3		-800			800-	- 24
			·		Q\$6				- 25
14	а.		-	Ants 3	12			850 -	- 26
									- 27
								900-	-

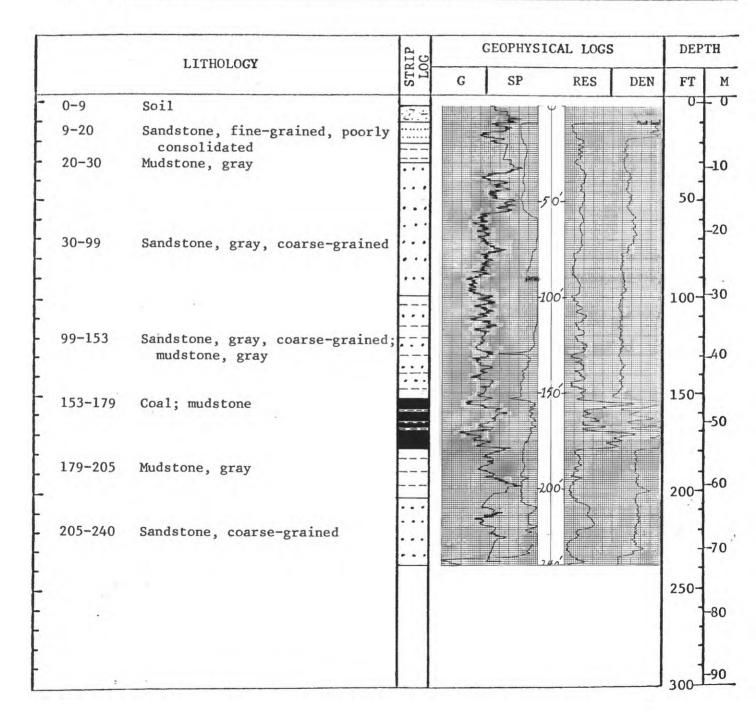
Hole No. M102 Map MacFarlane Reservoir Date logged 10-2-77 Elevation (ft) 8,200 Location: T. 7 N., R. 80 W., sec. 25 : 1350 FSL 1000FW L Cored: Yes X No Drilled depth 800 Logged depth 802 Drilling medium mud Fluid level 16 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm 500 ohms/in Logging speed Resistivity (RES): Scale fpm T.C. 4 Gamma (G): Scale 200 cps/in 20 fpm Logging speed Density (DEN): T.C. 4 3.2 Kcps/in Scale 20 fpm Logging speed Remarks: Water (5 GPM) between 290' and 305'.



	L:ITHOLOGY	STRIP	GEO	PHYSICA	L LOGS		DE	РТН
		STI	G	SP	RES	DEN	FT	М
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300-700	Sandstone, as above				7		-	
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	BITHOL			STRIP	G	SP	RES	DEN	FT	м
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700-802	Sandstone	, as above					\$			- 22
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Hole No. M104 Map MacFarlane Reservoir Date logged 9-27-77 Elevation (ft) 8,160 Location: T. 7 N., R. 8 W., sec. 27 : 2600 FN L 2000 FW L Cored: Yes X No Drilled depth 240 Logged depth 240 Drilling medium air Fluid level 109 Geophysical logs: Spontaneous potential (SP): Scale 25 mv/in Logging speed 20 fpm Scale 500 ohms/in Resistivity (RES): 20 fpm Logging speed T.C. 4 100 cps/in Gamma (G): Scale 20 fpm Logging speed Density (DEN): T.C. 4 3.2 Kcps/in Scale 20 fpm Logging speed Remarks:



Hole No. M108 Map MacFarlane Reservoir Date logged 9-27-77 Elevation (ft) 8,184 Location: T. 7 N., R. 80 W., sec. 35 : 450 FNL 0 FW L Cored: Yes X No Drilled depth 100 Logged depth 98 Drilling medium air Fluid level 15 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed Resistivity (RES): Scale 500 ohms/in Logging speed 20 fpm Gamma (G): T.C. 4 Scale 200 cps/in 20 fpm Logging speed Density (DEN): T.C. 4 Scale 3.2 Kcps/in 20 fpm Logging speed Remarks:

	LITHOLOGY	G	(GEOPHYS1	CAL LOGS	3	DEP	TH
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	N
0-8	Soil	1474			Y Table		0-	-
8-21	Siltstone, brown					Faction .		
21-40	Mudstone, gray					7	-	-10
40-55	Coal; mudstone at 42'-43'; bone coal at 51'-52'			-5	-p'		50-	
							-	-20
55-98	Siltstone, light-gray; micace coarser downward	eous					100-	-3
								41
							-	
		11					150-	
								-5
							200-	-61
								-70
							250-	
								-80
							300	-91

Hole No. M109 Map MacFarlane Reservoir Date logged 10-29-77 Elevation (ft) 8210 Location: T. 7 N., R. 80 W., sec. 35 : 1500 F SL 2325 FWL Cored: Yes X No Drilled depth 800 Logged depth 800 Drilling mediummud-air Fluid level 5 Geophysical logs: Spontaneous potential (SP): Scale 250 mv/in Logging speed 20 fpm 500 ohms/in Resistivity (RES): Scale Logging speed fpm T.C. 4 100 cps/in Gamma (C): Scale Logging speed fpm Density (DEN): T.C. Scale Logging speed fpm Density log on a separate sheet. Water (5 GPM) between 510' and 800'. No lithology or strip logs below 755'.

GEOPHYSICAL LOGS DEPTH STRIP LITHOLOGY SP DEN RES FT M - 0-8 Sandy soil, moderate - yellowishbrown 8-13 Siltstone, yellowish-gray 13-21 Sandstone, very light gray, finegrained (13'15'), medium--10 grained (15'-21'), with white 50mica; minor shale 21-26 Sandstone, as above, except fine- to coarse-grained; sand--20 stone, light-gray, fine- to medium-grained, with biotite 26-41 Silty mudstone, medium-dark-100--30 gray, with white mica; sandstone, light-gray, finegrained, poorly consolidated, with white mica 40 41-82 Sandstone, as above; sandstone, very light gray, fine- to coarse-grained, subangular, 150poorly consolidated, with white mica; shale, black -50 82-97 Silty mudstone, moderateyellowish-brown and yellowishgray; sandstone, fine- to medium-grained, poorly con-200solidated, with white mica 97-300 Sandstone, as above (41'-82'), except fine- to medium-grained -70 (100'-126'), very coarse grained (126'-131') medium-250grained (131'-205'), very coarse grained to very fine pebble -80 gravel (205'-220'), fine- to medium-grained (220'-340')~

	LITHOLOGY	STRIP	G	EOPHYSICA	L LOGS		DE	PTH
		STI	G	SP	RES	DEN	FT	М
200 2/0					Į.			-
300-342	Sandstone, as above, fine- to medium-grained			/				- 100
342-385	Shaly mudstone, dark-gray		\$		}	CCC		
1 2	3			-350-	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		350_	- 110
			Ę)			
			\$ 1	3	3		400-	- 120
385-489	Sandstone, as above (41'-82'), fine- to medium-grained, with	* , ; * * * * * * .		400-			400-	
	biotite		\{\bar{\} \\ \bar{\} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \				1	_ 130
				-450	}		450-	
					}		}	- 140
					}	_	-	
489-495	Shaly mudstone, black		Š	F	\leq		500	- 150
495 -5 60	Sandstone, as above (41'-82'); shaly mudstone, black	(0 E)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				500-	160
		• • • • •					1	_ 160
560-600	Mudstone, brownish-gray			-55°-			550-	- 170
300 000	nddstone, brownish gray				1			
			}				1	- 180
600-674	Sandstone, as above (41'-82')		3	-600-			600	
							1	- 190
		::::::	} .		1			
				-630-	Ì		650	- 200
574-700	Mudstone, brownish-gray	::::			J		+	
					>	000	7	- 210

	4	LITHO	LOCY			GIP		GEOP	HYSICA	L LOGS		DE	PTH
		DIM	2001			STRIP	G		SP	RES	DEN	FT	М
	700-710 3	Můdstone,	as above				E		1 7 7	4			
	710-728	Sandstone,	as above	(41'-82')		14	\$			3		-	- 220
	728-742	Mudstone,	brownish-	gray	E		\$						
	742-755 ,	Sandstone,	as above	(41'-82')	28				750'-	\$		750-	- 230
							<u> </u>	Ĺ					
										4			- 240
	• 15	12	~		27	24		1	900	(mm): Immiiia		800-	4 -
													- 250
	78	1L.	,-		4	4	. Fall-Att	8	L			850 -	- 260
													9.9
													- 270
_												900	

Hole No. M109 Map MacFarlane	Reservoir Date logged 10-2	9-77 Elevation (ft) 8210
Location: T. 7 N., R. 80 W.	, sec. 35 : 1500 Fs L2325	FWL Cored: Tyes X No
Drilled depth 800 Logged d	epth 651 Drilling medium	air-mud Fluid level 5
Geophysical logs:		
Spontaneous potential (SP):	Scale	Logging speed fpm
Resistivity (RES):	Scale	Logging speed fpm
Gamma (G): T.C	Scale	Logging speed fpm
Density (DEN): T.C. 4	Scale 3.2 Kcps/in	Logging speed 20 fpm
Remarks: SP, RES, and G 1	ogs on a separate sheet with	strip log.

	LITHOLOGY	IP	(GEOPHYSIC	AL LOGS		DEP	TH
	EIIIOLOGI	STRIP LOG	G	SP	RES	DEN	FT	N
0-8	Sandy soil, moderate - yellowish- brown						0-	- (
8-13 13-21	Siltstone, yellowish-gray Sandstone, very light gray, fine- grained (13'15'), medium-							-10
21-26	grained (15'-21'), with white mica; minor shale Sandstone, as above, except			-50-			50-	-20
	<pre>fine- to coarse-grained; sand- stone, light-gray, fine- to medium-grained, with biotite</pre>							
26-41	Silty mudstone, medium-dark- gray, with white mica; sand- stone, light-gray, fine-			100			100-	-30
41-82	grained, poorly consolidated, with white mica Sandstone, as above; sandstone,							40
	very light gray, fine- to coarse-grained, subangular, poorly consolidated, with white mica; shale, black	-		-150			150-	-50
82-97	Silty mudstone, moderate- yellowish-brown and yellowish- gray; sandstone, fine- to medium-grained, poorly con- solidated, with white mica			-200	,		200	-60
97- 300	Sandstone, as above (41'-82'), except fine- to medium-grained (100'-126'), very coarse						1	-70
	grained (126'-131') medium- grained (131'-205'), very coarse grained to very fine pebble gravel (205'-220'), fine- to			250			250-	-80
	medium-grained (220'-540')			-300			300	-9(

-	LITHOLOGY	STRIP LOG	GE	OPHYSICAL	LOGS		DE	PTH
		STI	G	SP	RES	DEN	FT	M
300-342	Sandstone, as above, fine- to medium-grained							- <u>1</u> 0
342-385	Shaly mudstone, dark-gray			350			350_	- 11
385-489	Sandstone, as above (41'-82'), fine- to medium-grained, with			4 0c'-			400-	- 12
	biotite			-450-			450-	- 13
	Shaly mudstone, black			-500			500-	- 14
495 ~5 60	Sandstone, as above (41'-82'); shaly mudstone, black							- 16
560-600 -	Mudstone, brownish-gray	- 1		-550-			550-	- 17
600- 651	Sandstone, as above (41'-82')			-600-			600	- 18 - 19
	4	. ,		-650'-			650-	- 20
							700	- 21

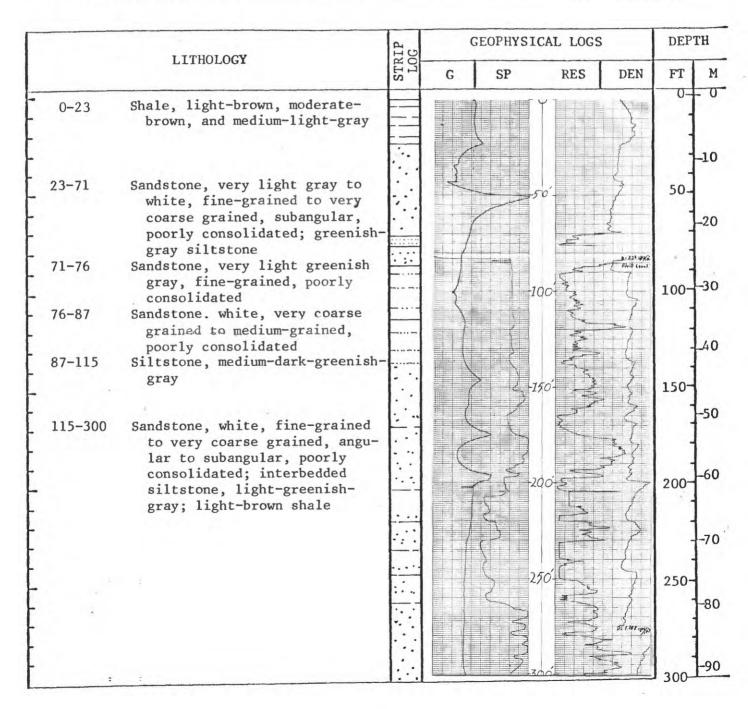
Hole No. M110 Map MacFarlane Reservoir Date logged 10-27-77 Elevation (ft) 8220 Location: T. 7 N., R. 80 W., sec. 35: 2100 FSL 375 FEL Cored: Yes x No Drilled depth 770 Logged depth 768 Drilling medium air-mud Fluid level 0 Geophysical logs: Spontaneous potential (SP): Scale 250 mv/in 20 fpm Logging speed 20 fpm Resistivity (RES): Scale 1000 ohms/in Logging speed Gamma (G): T.C. 4 Scale 1000 cps/in 20 fpm Logging speed Density (DEN): T.C. 4 Scale 1.6 cps/in 20 fpm Logging speed Remarks: Water (5 GPM) between 15' and 95'. No lithology log below 755'.

	LITHOLOGY	GIP	(GEOPHYSI	CAL LOGS	3	DEP	TH
	LITHOLOGI	STRIP	G	SP	RES	DEN	FT	I
0-4 4-18	Soil, moderate-yellowish-brown Sandstone, very light gray, weathered to pale-yellowish- brown, fine-grained, well- consolidated, white mica;						0-	-10
18-27	minor interbedded shale Sandstone, light-gray, mostly medium- to fine-grained, well- consolidated, with biotite				50'		50-	-20
27-32	Sandstone, very light gray, very coarse grained to medium-grained, subangular to angular, poorly consolidated, with				100-		100-	-30
32-39	white mica; minor shale, black Silty mudstone, medium-dark-gray with white mica; sandstone, medium-light-gray, fine- grained, poorly consolidated,							_4(
39-55	with white mica Sandstone, as above; some silty mudstone				50 - (150-	-50
55-78	Sandstone, very light gray, fine- to coarse-grained, subangular, poorly consolidated, with white mica; minor black shale				2001		200-	-61
78-104	Sandstone, as above; minor silty mudstone, moderate-yellowish-brown; sandstone, yellowish-	• • • •				*	200	-70
104-125	gray, fine- to medium-grained, poorly consolidated, with white mica				2.50-		250-	
	Sandstone, very light gray, fine- to coarse-grained, subangular, poorly consolidated, with white mica							-80
					200'		300-	-91

	LITHOLOGY	STRIP	GEO	PHYSICA	L LOGS		DE	PTH
		ST	G	SP	RES	DEN	FT	М
125-132	Sandstone, as above, except very							
132-208	coarse grained Sandstone, as above, except				}		J	
132 200	medium-grained							- 100
208-220	Sandstone, as above, except very		E					
	coarse grained to very fine						350-	
220-329	sandstone, as above, except			350'	7 }			- 110
220 32)	fine- to medium-grained						4	
					ř		-	
329-388	Shaly mudstone, dark-gray;	,			}		4	- 120
	sandstone, as above, with			.,,,,,,			400-	- 120
388-481	Sandstone, very light gray,			400-			4	
	fine- to medium-grained, sub-				1 }		4	
	angular, poorly consolidated,				\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \		-	_ 130
481-485	with white mica Shaly mudstone, black		T _a		}		-	
	Sandstone (see 388'-481')		1 E	450	<i>(</i> }		450-	
494-498	Shaly mudstone, black	*****			<i>}</i>		1	- 140
498-508	Sandstone (see 388'-481')			0	}		1	
508-514	Mudstone *		# <u>:</u>					
								150
51/-520	Sandstone (see 388'-481'); mud-,	===		of or	} {		500-	- 150
) I T J Z J 3	stone, brownish-gray	4) 300	__ {		2007	
)			
							-	- 160
529-593	Mudatana huamish				}			
329-393	Mudstone, brownish-gray			550'			550-	
4		1					-	- 170
					4		1	
502 ((0	4)			
593-662	Sandstone, very light gray, medium- to coarse-grained,						1	- 180
	subspaules to subspauled			600'	}		600	
	poorly consolidated, with							
	white mica				1			100
			4		$\zeta = \zeta$		1	- 190
					3			
				650		> 1	650	
662-700	Mudstone, brownish-gray	• • •]-	- 200
]	
							J	
			-].	210
					5		1	

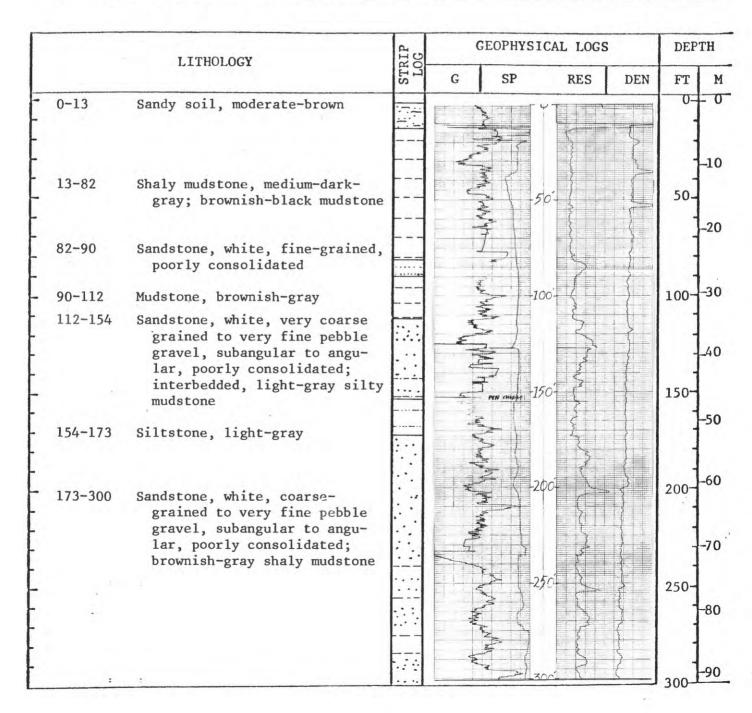
	LITHOLOGY	E E		GEOPI	HYSICA	L LOGS		DE	PTH
	211102001	STRIP LOG	G		SP	RES	DEN	FT	М
700-709	Mudstone, brownish-gray								. 43
709-742	Sandstone, as at 593'-662', except very coarse grained to medium-grained								- 220
. 70	to medium-grained				-750	<u>, </u>		750-	
742-750									- 230
750-755	Sandstone (see 709'-742')								- 240
*1	B 100	3 11		Pi	p-s -			800-	
									- 250
	7								
7	Be (24)		J/8-171	Ü	in a			850 -	- 260
									- 270
		لبل						900	

Hole No. T111 Map Teal I	ake	Date logged 10-1	1-77 Elevation	(ft) 8370
Location: T. 7 N., R. 81 W	., sec. 19	: 675 FSL 2075 F	EL Cored: Y	es x No
Drilled depth 600 Logged	depth 600	_Drilling medium_	air Fluid lev	e1_85
Geophysical logs:		*		
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed_	20 fpm
Resistivity (RES):	Scale 5	00 ohms/in	Logging speed_	20 fpm
Gamma (G): T.C. 4	Scale 1	00 cps/in	Logging speed_	20 fpm
Density (DEN): T.C. 4	Scale 3	.2 Kcps/in	Logging speed_	20 fpm
Remarks: Water (5 GPM) bet	ween 60' and	415'•		



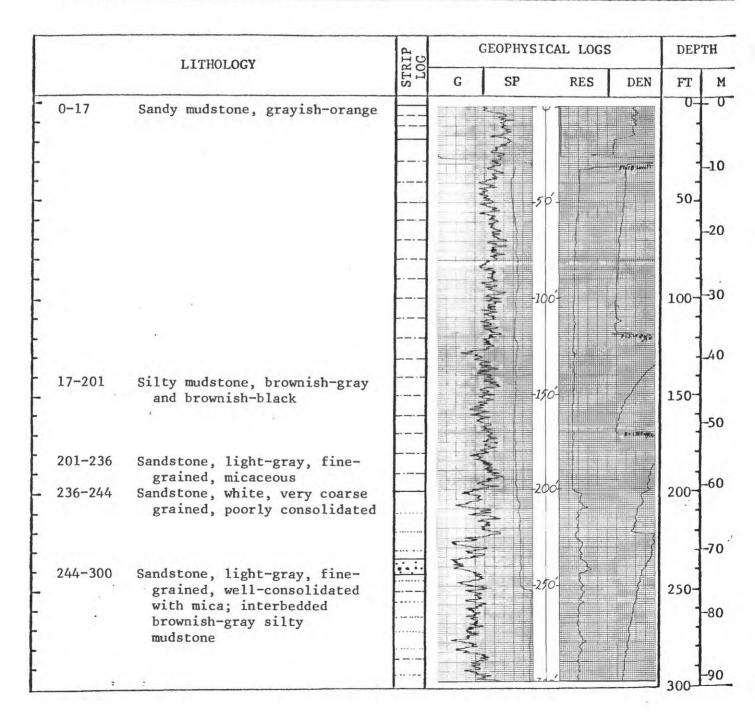
	ĻITHOLOGY	STRIP LOG	GEO	PHYSICAL 1	LOGS	DE	PTH
	J.I. Mobodi	STE	G	SP	RES DE	N FT	М
-1	2	1		- Y'E	5 4 1 1 1		
		:					-
	1.1						1
					District Dis		1
000 100		10		350		350-	+
300-406	Sandstone, siltstone, and sha as above	i i e,					1-1
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406-600	Shaly mudstone, medium-dark- gray]
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Teal Lake Date logged 10-12-77 Elevation (ft) 8250 Hole No. T112 Map Location: T. 7 N., R. 81 W., sec. 20 : 200 FSL 2575 FE L Cored: Yes X No Drilled depth 500 Logged depth 500 Drilling medium Fluid level 12 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed 500 ohms/in Resistivity (RES): Scale Logging speed fpm T.C. 4 200 cps/in Gamma (G): Scale Logging speed fpm Density (DEN): T.C. 4 3.2 Kcps/in Scale 20 Logging speed fpm Remarks: Water (5 GPM) between 120' and 420'.



		LITI	HOLOGY			STRIP LOG	GEOPHYSICAL LOGS					PTH
		7-1.				STF	G	SP	RES	DEN	FT	М
	300-335	Sandston as abo	e and sha	ly mudsto	ne,		Man White	350			350-	- 10 - 11
	335-444	Sandston poorly	e, white,	fine-gra ated	ined,							- 12
•	444-500	Shaly mu	ndstone, b	rownish-g	ray;		W.				400-	_ 13
	.2	31		*	i ŝ		The state of the s	450			450-	- 14
	e)					enex.	r forwald format of	sto		-) -)	500-	- 15 - 16
	_3				1	××.		* 4.			550-	- 17
	1,0	À		9	2* 6	w					600-	- 18 - 19
	,										650-	- 20
	j.						-				700	- 21

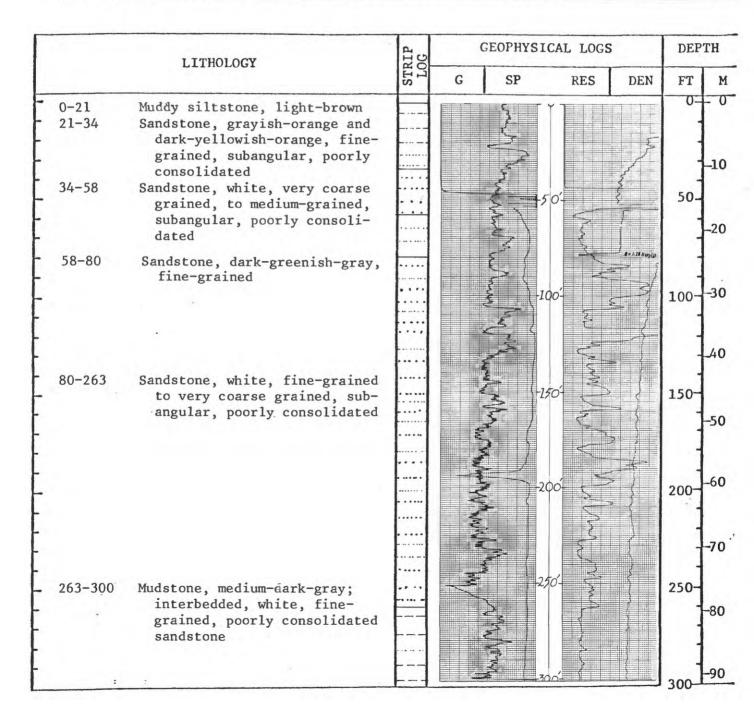
Hole No. T115 Map Teal Lake Date logged 10-11-77 Elevation (ft) 8300 Location: T. 7 N., R. 81 W., sec. 29 : 1675 FS L 1900 FE L Cored: Yes x No Drilled depth 500 Logged depth 500 Drilling medium air Fluid level 32 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in Logging speed 20 fpm Resistivity (RES): Scale 500 ohms/in Logging speed 20 fpm T.C. 4 Scale 200 cps/in Gamma (G): 20 fpm Logging speed Density (DEN): T.C. 4 Scale 3.2 Kcps/in 20 fpm Logging speed Remarks: Water (5 GPM) between 330' and 460'.



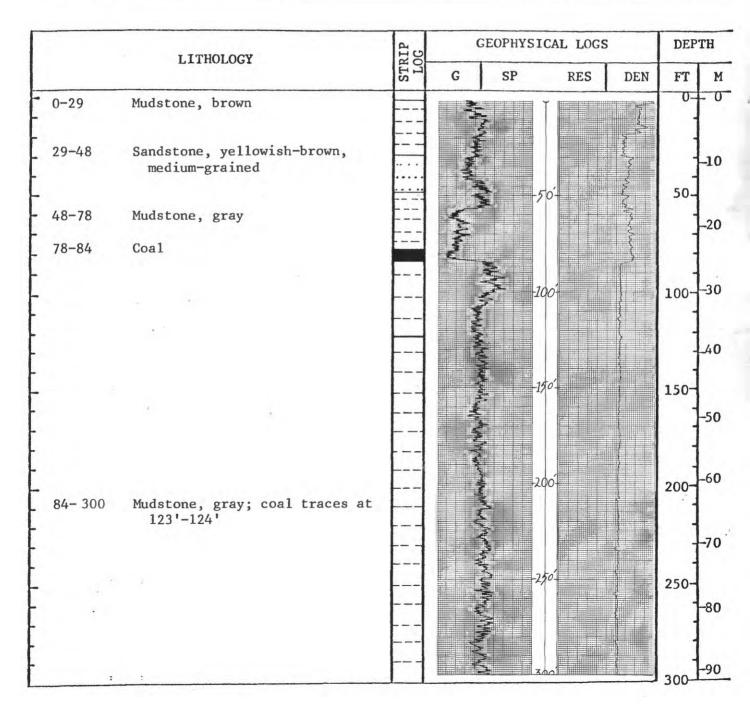
	LITHOLOGY	STRIP LOG	GEO	PHYSICAL	LOGS		DE	PTH
	22	STI	G	SP	RES	DEN	FT	М
300-328 328-368	Sandstone and silty mudstone, as above Sandstone, white, very coarse to fine-grained; angular to subangular, poorly consolidated			350°			350-	- 10 - 11
368-412	Sandstone, greenish-gray, fine- grained, with mica; inter- bedded brownish-gray silty mudstone			-400-			400-	- 1 2
412-420	Sandstone, white, very coarse							- 13
is -	grained		AM TON	-450			450-	- 14
420-500	Silty mudstone, brownish-gray			500			500-	- 15 - 16
-4				- %			550-	- 17
12			i				600-	– 18
							650-	- 19 - 20
.*	- 4	٦٠٠٠					650-	

300-394 Mudstone and sandstone, as above 350-350-400 400-450-450-550-550-600-600-600-600-600-600-600-6	211	LITHOLOGY	STRIP	GEOPHYSICAL LOGS				DEPTH		
300-394 Mudstone and sandstone, as above 350-350-350-350-350-350-350-350-350-350-				ST	G SP RES D		DEN	FT	М	
above 350 400 400 450 550 600	-1 3-	ž.				7				
394-500 Siltstone, brownish-gray 500-	300-394	Mudstone and sandstone, a	as						-	- 100
394-500 Siltstone, brownish-gray 500-					13				250	
394-500 Siltstone, brownish-gray 500- 550-	à.		*4			350-	}		330-	- 110
394-500 Siltstone, brownish-gray 500- 550-										
394-500 Siltstone, brownish-gray 500- 550-	. 24	э	;;			-400	}		400-	- 120
394-500 Siltstone, brownish-gray 500- 550-					77					_ 130
394-500 Siltstone, brownish-gray 500- 500-		3 0				450			450-	- 140
550-	394-500	Siltstone, brownish-gray							1	
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	7							-	7	- 210

Hole No. Tll6 Map Teal Lake		Date logged 10-1	1-77 Elevation	(ft) 8,435
Location: T. 7 N., R. 81 W.,	sec. 30	: 0 FSL 1000 F	E L Cored: Y	es x No
Drilled depth 500 Logged de	pth 500	Drilling medium	air Fluid lev	re1_54
Geophysical logs:				
Spontaneous potential (SP):	Scale	50 mv/in	Logging speed_	20 fpm
Resistivity (RES):	Scale	500 ohms/in	Logging speed	20 fpm
Gamma (G): T.C. 4	Scale	100 cps/in	Logging speed	20 fpm
	-	3.2 Kcps/in	Logging speed_	20 fpm
Remarks: Water (5 GPM) between	en 40' and	d 360'.		



Hole No. Cll7 Map Coalmont Date logged 9-30-77 Elevation (ft) 8,930 Location: T. 7 N., R. 81 W., sec. 33 : 1100 F SL 1675 FE L Cored: Yes X No Drilled depth 500 Logged depth 500 Drilling medium air Fluid level 384 Geophysical logs: Spontaneous potential (SP): Scale 50 mv/in 20 fpm Logging speed 500 ohms/in 20 fpm Resistivity (RES): Scale Logging speed 200 cps/in Gamma (G): T.C. 4 20 fpm Scale Logging speed 16 Kcps/in Density (DEN): T.C. 4 20 fpm Scale Logging speed Remarks:



LITHOLOGY			STRIP	GEOPHYSICAL LOGS				DEPTH			
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